RAILROAD GAZETTE

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Contributions.

A Primitive Ice Breaker.

New York, Aug. 6, 1898.

To the Editor of the Railroad Gazette:

The attached newspaper slip describing "An Ice Breaking Vessel," built by Armstrong, Whitworth & Co. for Russia, leads me to state that more than 40 years ago, to a young engineer, who afterward in successful practice won his spurs, was assigned in early winter the duty of liberating an ice bound fleet of canal boats, laden with coal, and to bring them to their destination.

He procured two heavy cart wheels and fitted them to a large sapling, one at each end, and at a distance apart somewhat greater than the width of the boats. The sapling he secured to the bow of the leading boat so that with a wheel at each side the lowermost point of their tires was about on a level with the underside of the ice. Then with a strong team he cut a path through and quickly brought the fleet into port.

The idea is so old that at present it may seem new.

G. LEVERICH.

The Money Value of the Small Boy.

New York, July 25, 1898.

To the Editor of the Railroad Gazette:

Those of your readers who are interested in "railroad law" will be pleased to hear that the world-renowned state, lying at your door, which from time immemorial has supplied the civilized peoples of the earth with a sterling quality of "Jersey justice," has lately turned out one of its most shining gems.

Justice down in Jersey has always been somewhat erratic, but it has been reserved for Mr. Justice Gummere to furnish the latest legal sensation, through an opinion just handed down, in the case of Graham v. the Jersey City Consolidated Traction Company. It seems that a verdict had been rendered against the corporation for $5,000 damages for gross negligence in killing the plaintiff's five-year-old son. This verdict has just been set aside by Mr. Gummere on the ground that it is excessive. "Children," he remarks, "are an expense as a rule and not a pecuniary benefit to their parents."

Now it only remains for the traction company to sue Mr. Graham for services rendered in expeditiously killing his boy, as a chronic source of vexation and expense. Similarly, in the case of men advanced in life, it may be to the advantage of their heirs at law and next of kin to have them disposed of before they have any further chance to make longevity disreputable by persisting in it.

R. L. M.

Gain or Increase?

Receiver's Office, B. & O. R. R.,
Baltimore, Sept. 3, 1898.

To the Editor of the Railroad Gazette:

In the first of your leading articles in your issue of Sept. 2, you make use of the following language: "The gain in gross was over 51 million dollars, or 11.73 per cent. The gain in operating expenses was 33⅓ million dollars, or 10.71 per cent."

We take exception to the use of the word gain, as applied to operating expenses, because the word in every sense implies an advantage or a benefit. A man gains in a business transaction, or he gains a point in an argument, or a traveler gains his native shore; do not all these imply benefit or advantage? But there is no possible benefit or advantage in increased operating expenses, when one is considering simply a financial result. Would it not have been better to have used the word "increase?"

M. B. WILD.

[There can be no question about it. Nine times out of ten the editor would have written increase, not gain. To be sure one definition of gain is "increase of amount or degree;" but a nice sense of the weight of words beats the dictionary. However, in the use of language as in table manners and in a thousand other things, we tend to revert to barbarism unless we watch ourselves, and keep in close contact with high standards. Notice for example your own use of a double perfect tense in the last sentence of your note. Why not say "to use" instead of "to have used"?—Editor Railroad Gazette.]

The Dinner to the Fleet Engineers.

The dinner given by the Engineers' Club (New York) on Thursday evening, Sept. 1, to the engineers of the fleet in New York Harbor was a delightful affair, in spite of the very intense heat. It was quite informal, and the sagacious president of the Club had announced that there would be no speech making. Mr. Milligan, Chief Engineer of the Oregon, was, however, prevailed upon to tell something of the voyage from Puget Sound to Jupiter Inlet. Among other interesting facts, he told of the difference in the coal procured at San Francisco, and that taken on the Atlantic coast. These particulars we gave in our issue of Aug. 26. From San Francisco to Callao the knots run per ton of coal averaged 4.24; up the east coast the average fell as low as 3.3 for the run of 1,684 knots, from Barbadoes to Jupiter Inlet. The coal taken at San Francisco was a good Welsh coal and Mr. Milligan had the foresight to keep some of this in his bunkers against the hour of a fight, and this was the coal which was burned in the pursuit of the Colon, when the Oregon got up to her maximum speed within fifteen minutes after starting and made such an extraordinary performance that the story went around that all the oil on board had been burned in the furnaces. Mr. Milligan says, however, that no oil was burnt; simply good coal.

At Rio Capt. Clark was informed that he might meet the Cape Verde fleet. He laid before his officers his plan, which was to turn and run as fast as he could and so string out the Spanish fleet in the order of the relative speed of the vessels and then stop and whip them in detail. Mr. Milligan said that in view of what happened later, this probably could have been done. It seems almost a pity that Capt. Clark and the Oregon did not have a chance to try it.

Mr. Milligan spoke very highly of the officers and men under his command. At one time some of them worked 26 consecutive hours overhauling machinery, and then when the ship went to sea took up their regular watches without interruption.

The Progress of the Deep Waterway Survey.

One of the most important undertakings now going on in the peaceful field of government work in this country, is that of the United States Board of Engineers for Deep Waterways. This Board was created by special act of Congress and directed to execute certain surveys recommended by the Deep Waterways Commission in its report of January, 1896. The act creating the Board, passed in June, 1897, provided for an appropriation of $150,000. No specific depth of channel was named, but the requirement was in general for a waterway for the passage of seagoing vessels to ports on the Great Lakes. In June of this year an additional appropriation of $225,000 was made, and depths of 21 ft. and 30 ft., respectively, were specified. The members of the Board of Engineers, as appointed by the President, are: Lieut.-Col. C. W. Raymond, Corps of Engineers, U. S. A., M. Am. Soc. C. E.; Alfred Noble, M. Am. Soc. C. E., and George Y. Wisner, M. Am. Soc. C. E.

The work being done under direction of the Board embraces surveys and investigations of two projects for canals, having depths of 21 and 30 ft. respectively. From Lake Erie to Lake Ontario the surveys are now completed. Two alternative routes for the outlet from Lake Ontario are now being surveyed. One, the Oswego route, from Oswego, by way of Oneida Lake and Rome to the mouth of the Mohawk, at Troy, is being surveyed by two parties under Assistant Engineers A. J. Hines, Assoc. M. Am. Soc. C. E., and D. J. Howell, C. E. The total length of this proposed route is 177 miles, and of this about 130 miles has been surveyed. This survey will be completed this fall.

The other route being surveyed is for an outlet by way of the St. Lawrence River to Lake St. Francis, thence across the country to King's Bay, near the foot of Lake Champlain, along Lake Champlain to its head at Whitehall, thence across the divide to the Hudson at Ft. Edward, and down the Hudson to the seaboard. About 40 miles of this route, between Troy and Ft. Edward, has been surveyed by a party under Mr. Chas. L. Harrison, C. E., who expects to complete this portion of the survey to deep water in Lake Champlain this season.

Another party, under Mr. F. P. Davis, M. Am. Soc. C. E., has just begun surveys between King's Bay and Lake St. Francis, while a party under Mr. J. W. Beardsley, C. E., is investigating the shoal portions of the St. Lawrence River between Lake Ontario and Lake St. Francis; these surveys will probably not be completed before next year. A party under Mr. H. F. Dose, C. E., is making a survey along the Hudson below Troy, as about 35 miles of the channel will require deepening. The investigation of a water supply for the summit level of the Oswego route is being made by Mr. George W. Rafter, M. Am. Soc. C. E.

A very important feature of the work is gaging the Niagara River. Last year gagings were carried on under the direction of Mr. E. E. Haskell, C. E., and this season another series is being made by a party under Mr. Francis Shenehon, C. E. The gagings last fall were made during a low stage of water, while this summer's gagings are taken at a mean stage. The object of these gagings is to obtain reliable data to be used in connection with a study of the problem of regulating the level of Lake Erie. Gagings of Niagara River have been previously made by D. Farrand Henry, C. E., for the United States Lake Survey, prior to 1870, and by J. C. Quintus, C. E., under Major E. H. Ruffner, Corps of Engineers, U. S. A., in 1892.

The report of the Board of Engineers, when issued, will embrace carefully prepared and comprehensive estimates of the cost of canals by either of the two routes mentioned, and of channel depths of both 21 and 30 ft.

The Manchester Ship Canal.

The recent half yearly report of the Manchester Ship Canal affords an opportunity of comparing the present position and prospects of that undertaking with the anticipations of its promoters at the time of its completion. Nearly five years ago the work was successfully accomplished at a cost of about $77,000,000, the capital being apportioned as follows:

First debentures at 3½ per cent.	$6,795,000
First debentures at 4 per cent.	2,240,000
Second debentures at 4 per cent.	3,000,000
Manchester Corporation debentures, 4½ per cent.	25,000,000
5 per cent. preference shares.	20,000,000
Ordinary shares.	20,000,000

To pay the interest on the first and second debentures requires an annual net earning of $447,425; to pay in addition the interest on the Corporation debentures would require $1,572,425 total net earnings; to pay all fixed charges and 5 per cent. on the preferred shares would require $2,572,425; while to pay in addition a similar dividend on the ordinary shares would require $3,572,425 in all.

Estimates made about the time of the opening of the canal assumed that an annual traffic of 3,000,000 tons of toll-paying merchandise might be expected after a few years, and the revenues therefrom were estimated as follows:

Gross revenue from ship canal	$4,125,000
Expenses	880,000
Net revenue	3,245,000
Add profits of Bridgewater Canal	300,000
Total net revenue	$3,545,000

giving all but enough to pay fixed charges and 5% on all the shares as shown above.

With this must be compared the actual results as shown by the latest returns. The tonnage of paying merchandise for the last 12 months has been 2,282,485; within measurable distance of the estimated 3,000,000, which will be reached by the year 1900, if the rate of increase, hitherto fairly steady, be maintained. The revenue, however, does not show nearly so well in the comparison:

Gross revenue (actual) from ship canal	$1,070,140
Expenses	872,240
Net revenue	197,900
Add profits of Bridgewater Canal	218,785
Total net revenue	416,685

Here the working expenses do not exceed the estimated amount and as they are decreasing slightly, in spite of the increasing traffic, it may be said that the estimate in this particular is fairly borne out. The revenue on the contrary is very far below the estimate for such tonnage as has been carried, and this plainly for the reason that no dues have been levied on the vessels passing through the canal, so that the only source of revenue practically has been the wharfage dues on merchandise embarked or landed. It seems that this concession has been found necessary in order to induce vessels to come up to Manchester without charging higher freight rates than to Liverpool; nor is it likely that the conditions will change in this respect, as the present tendency is toward the employment, for the purpose of economical ocean carriage, of larger vessels than can pass through the canal.

The conclusion seems evident that in the matter of earnings the canal not only does, but will for many years at any rate, fall far short of the anticipations on which any expectations of profit for the shareholders were based. At present it may be noted the net revenue does not even suffice to pay the interest on the first and second debentures; there is, however, a fund set apart out of the earnings of the Bridge-

water canal during the construction of the ship canal, which were allowed to accumulate for this purpose, from which the deficit has been met, and the increasing traffic shows that in all probability after the present year this item of debenture interest will be covered by the earnings.

There remains the interest on the Manchester Corporation debentures to be considered, toward which nothing has hitherto been earned, and to meet which the annual net revenue must be increased nearly fourfold. Hitherto no pressure has been put upon the canal company for the payment of this interest, which has been met by the Corporation, a special rate being levied for the purpose. This rate amounts to 13 pence in the pound on the rated rental valuation of taxable city property, but (according to the friends of the canal), it is paid cheerfully on the ground that the city receives indirect benefits from the canal far exceeding in value the sum thus levied. Certainly, if the saving to Manchester firms by the reduction, since and presumably consequent on the construction of the canal, of 44c. per ton in railroad freight rates from Liverpool to Manchester and of 36c. per ton in the Liverpool dock dues on cotton be taken into account, figures go far toward confirming this statement.

At any rate the solvency of the canal as against any foreclosure proceedings from debentures holders seems to be fairly established, while on the other hand the prospect of any profit for the shareholders seems to be hopelessly remote. It should be noted that in consideration of their guarantee of the 4½ per cent. interest on the $25,000,000 of Corporation debentures the Corporation of Manchester have by act of Parliament the right to appoint 11 out of the 21 directors of the canal company; thus it may be taken as assured that the future management of the canal will be at least as much in the interests of Manchester generally, by the establishment of low rates, as with a view to the ultimate prospect of some return to the shareholders.

The engineering difficulties involved in building the canal have been well met, and the works are all in good condition. The depth and dimensions of the locks are such as to admit vessels of practically the largest size in general use at the time of their design; but it is likely that they would have been made even larger, had it been possible to foresee the recent increase in the size of ocean-going steamers. The largest vessel hitherto passed has been one of 53 ft. beam and 24 ft. draught, and while the clear dimensions of 65 ft. by 26 will admit something more than this, yet it would be impossible to accommodate such of the recent Atlantic liners as the Lucania and Campania, or the Kaiser Friedrich and Kaiser Wilhelm der Grosse. The main difficulty, however, now to be faced is that no very great increase of the present traffic can be accommodated without further expenditure on the dock and terminal facilities at Manchester, and that, the capital and borrowing powers of the company being exhausted, no funds are available for the purpose. During the past year, however, a large and well equipped grain elevator and extensive dock sheds have been built from funds provided by a subsidiary company on a lease arrangement, and powers have been recently obtained for raising $500,000 for similar purposes on the security of the surplus lands of the company. The formation of the Manchester Liners Company, with a capital of $1,750,000, is also a step toward the establishment of a fleet of steamers having Manchester as their home port. M. E. Y.

Eltham, Aug. 17.

Railroad Building in South Africa.

In our issue of Aug. 19 we published an article on the railroads in South Africa, covering the country south of Kimberley, Cape Colony and Bloemfontein, Orange Free State. We now show a map of the railroads (existing and proposed) in the Orange Free State, South African Republic and Rhodesia.

The largest system is the Netherlands South African Railway Company, which operates the lines from Johannesburg west and southwest to Klerksdorp, southwest to a connection with the Orange Free State Railways near Vereeniging and southeast to a connection with the Natal Government Railways near Volksrust; the line from Springs west, north and east via Elandsfontein and Pretoria to a connection with the Portuguese Railways on the border line just east of Komatipoort and the branch from Kaapmuiden southwest to Barberton (35 miles), in all 717 miles, including 16 miles double track and seven miles of three tracks. No new work is under way or contemplated. The officers of the company are: Mr. G. A. A. Middleberg, Director; Mr. C. L. Plate, Chief Traffic Manager; Mr. M. E. H. Bruening, Chief Engineer, and Mr. M. E. De Wildt, Secretary.

The Pretoria-Pietersburg Railroad is open for traffic from Pretoria, on the Netherlands South African Railroad north to Nylstroom, 81 miles, with stations at Pienaars River and Warm Baths, and is being extended from Nylstroom to Pietersburg, about 101 miles further in a northeasterly direction. On July 6 track had been laid for a distance of 57¾ miles northeast of Nylstroom. The object in reaching Pietersburg is to tap the gold fields of Zoutpansberg.

Work on a greater part of the road has been comparatively easy, the exceptions being in building around mountains. The line will eventually be straightened, when a ruling gradient of one in 50 will be possible. The rails (60-lb.) for the road were bought in England, the locomotives from Beyer, Peacock & Co., of Manchester, England; the passenger cars from Birmingham, England, and the freight cars from the Gloucester Wagon Co., Gloucester, England.

It is possible that extensions will be built from Pietersburg to the stronghold of a native chief 60 miles distant, and that another line will leave the Pretoria-Pietersburg Railroad at a point about 12 miles from Pretoria and bring Rustenberg, one of the principal towns of the Transvaal and about 90 miles west of Pretoria, in direct communication with Pretoria.

The General Manager of the Pretoria-Pietersburg Railroad is Mr. G. Mayo, Pretoria, Z. A. R., to whom we are indebted for the information given in reference to that road.

Another line is proposed in the Transvaal from Komatipoort, on the Netherlands South African Railroad, northwest to Leydsdorp.

The line of the Bechuanaland Railroad was formally opened to Bulawayo Nov. 4, 1897, and is worked by the Government Railroad Department. Mr. C. P. Elliott, C. M. G., LL. B., General Manager of the Railroads of the Cape of Good Hope, in his report for the year 1897, says in reference to the Bechuanaland Railroad: "The line was built as a pioneer line, and is, therefore, not as well constructed or equipped as the Government railways. The most important bridges are still to be erected, and the line still requires to be ballasted in many places; but there were natural features which were favorable to rapid construction of the railway, although the heavy rains that fell shortly after the opening of the line retarded the traffic very seriously, so that the Department had

Sketch Map, Showing Railroads in South Africa North of Cape Colony.

to work under serious difficulties. Accommodation for our men was, and still is, very scanty, and the scarcity of what would generally be looked upon as some of the absolute necessaries of life proved a severe tax upon our men. By degrees these drawbacks will be removed, but I think those who have borne the heat and burden of the day amid special difficulties and drawbacks require very cordial thanks for the manner in which they have executed the duties intrusted to them."

The lines comprising the Orange Free State Railways, all in the Orange Free State, are those from Donkerpoort (about 35 miles southwest of Springfontein) northwest to Viljoens Drift, near the border line, and including the short branch from Springfontein southeast to Bethulie. Extensions are proposed from Springfontein northwest to Fauresmith, 45 miles; Bloemfontein, southeast to Wepener, 55 miles, and Winburg southeast to Ficksburg, 55 miles. A line is also proposed from Harrismith, on the line of the Natal Government Railways, northwest via Bethlehem to Wolvehoek, on the Orarge Free State Railways.

The railroads shown in Natal are known as the Natal Government Railways, and those in Mozambique (Portuguese Possessions) from Komatipoort southeast to Lorenzo Marquez and Fontes Villa northwest towards Salisbury, in Rhodesia, as the Portuguese Railways.

The Waterloo & City Railway.—London.

London's second underground electric railroad was formally opened by H. R. H. the Duke of Cambridge on July 11, but it was not until Monday, August 8, that public traffic commenced. Most of the constructive features of the new line have been ably described in the Railroad Gazette,* but some particulars of the actual working will probably be of interest.

The trains run as often as the traffic requires from 8 a. m. till 10 p. m. This means about every 5 or 6 minutes during the rush to the city in the morning and the same in the evening back to Waterloo. About midday a train every 15 minutes is found enough just yet, but of course the traffic has not had time to develop itself.

The coolness of the stations and tunnels is very pleasant during the spell of heat we are now having and is in marked contrast to the underground steam railroads. Both termini of the Waterloo & City Railway are approached by stiff gradients, 1 in 60 at the former place and 1 in 88 at the latter. These of course facilitate starting and stopping admirably. From 5 to 5½ minutes are usually taken on the run of 1 mile, 4 furlongs and nearly 7 chains, say 1⅗ miles in round numbers.

Only one class of carriage is used, single journeys costing 2 pence and being registered by a turnstile, without tickets. For return journeys the fare is 3 pence, pink tickets being issued at the city and white ones at Waterloo. These were at first available only on the day of issue, but can now be used the day after, or if obtained on Saturday, on the following Monday. Instead of being torn in half after the outward journey, as usual, the whole ticket is retained and given up when passing through the turnstile on the return.

No Sunday trains are run at present, but this arrangement is hardly likely to be permanent. Though there would be no business traffic on Sundays, the line forms an important new link between the east and northeast of London and the suburban line of the London & South Western Railroad, with its many pleasure resorts. But the connection at the city end with other electric lines now making will of itself render Sunday traffic a necessity in due course, as well as an earlier and later service on week days than that now running.

The trains are all made up of four coaches, the latter being numbered, while the trains are marked A, B, C, etc. The two end cars seat 46 passengers each, and smoking is allowed only in these. The other coaches have somewhat more room, seating 56 travelers. Three seats on each side, next the motor compartment, are raised a couple of steps above the floor of the vehicle. In all the coaches the end seats are arranged longitudinally, the middle ones transversely, with a passage between. The motor coaches have a small door on each side, next the raised seats; it slides back and can only be opened from the outside. Between the vehicles collapsible iron gates are used.

Seven incandescent lights in a central row in ground glass globes give a very steady light. On the City & South London Electric Railway the variations of light are somewhat annoying, evidently depending on the tractive power, but on the new line this defect is happily done away with. No drapery or upholstery of any kind is employed. In this there has been shown much good judgment, as it gets very dusty and dirty with the mixed classes of London travelers and the perpetual currents of air. Both the quality and workmanship of the wooden fittings are generally admired. The roofs are covered with Lincrusta Walton inside and with canvas painted brown outside, the shape being about semicircular. Framed and colored views of scenery on the London & South West Railway help to adorn the very pleasing interiors. Sliding ventilators are provided over each of the 32 fixed windows. Two green lights are shown in the buffer when running and are changed to red by insertion of colored slides when the direction of the train is reversed.

At the city station the trains depart from the same side as they arrive at, the two lines crossing each other at the station entrance to admit of this. The two platforms are in separate tunnels, 23 ft. in diameter, with six openings from one to the other in the dividing wall. These openings are provided with stout gates. The buffer-stop, turnstile and pay-box are just inside the double tunnel, from which a single smaller one, about 15 ft. in diameter, leads up by a gentle slope to two short staircases, right and left, at the corners of Queen Victoria street. These bring the traveler up to the surface at the very heart of the city of London, with the Bank of England and Royal Exchange just in front, an unrivaled position for business.

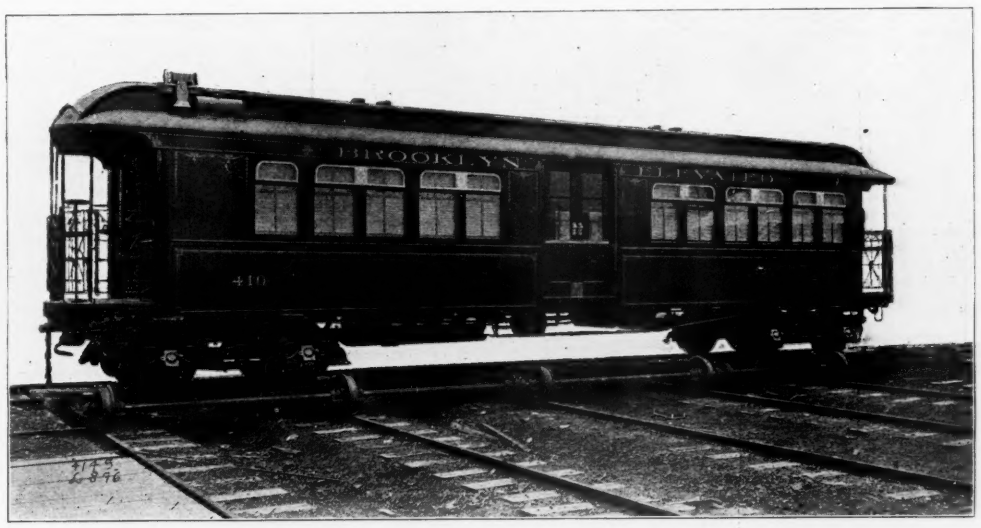
The smaller tunnel will go straight from the foot of the stairs to the other electric lines when they are finished. Only the left hand tunnel as you go down into the station is used by intending travelers; if the train happens to be at the right hand platform they pass to it through the openings just mentioned. Both arriving and departing passengers use the long sloping tunnel, which is paved with wood, lighted both by gas and electricity, and lined with white tiles. In fact, all parts of both stations that are visible to the public are tiled, and as the lighting is extremely good the effect is most cheerful. The tunnels are cemented inside flush with the flanges of the iron segments, and have electric lights at frequent intervals along

*For previous recent articles see Railroad Gazette Feb. 4, 1898, p. 77, July 15, 1898, p. 517, and Aug. 12 last, p. 575

one side. What need there is for lighting these tunnels more than any others is not apparent. Special precautions had to be taken in passing under three railroads and close to large, heavy buildings, such as the Times newspaper office, the Union Bank of London and the Mansion House, but all was accomplished without mishap.

The line is really an extension of the London & South Western and is worked by that company. It is scarcely possible to doubt that it will be a success financially, in which case an additional impulse will be given to the construction of these much needed lines of communication.

It should be added that the trains are fitted with the Westinghouse brake, air for which is compressed at the Waterloo end, where the power house is situ-



Electric Motor Car for Brooklyn Elevated Railroad—Built by Pullman's Palace Car Co.

ated. As there is a bit of 1 in 30 down going toward the city ample brake power is of course absolutely necessary. W. B. PALEY.

London, August 16, 1898.

Pullman Motor Cars for the Brooklyn Elevated.

Since the Brooklyn elevated railroads began running their trains across the New York & Brooklyn Bridge additional motor cars have been secured, besides those formerly controlled by the bridge authorities. Twelve cars, one of which is shown in the accompanying engravings, have been built by Pullman's Palace Car Company. These are now being used daily to haul the trains across the bridge from the points where the steam locomotives are taken off —some being uncoupled at Bridge street, and others at the Brooklyn terminal station. During a part of the day, when the traffic is light, the cables are not worked, the trains being hauled between the cities by the motor cars only.

Each of these cars has four 80 h. p. Walker motors connected up on the Sprague multiple-unit system of control. It will be observed that side doors, shown in the engraving, give these cars a similar appearance to the bridge cars.

The interiors of the cars are finished very much like the cars of the Brooklyn Bridge, considerable standing room being available. The interior finish is in mahogany of special design. Hale & Kilburn spring seats, covered with rattan, are used. These cars are 29 ft. 3 in. over the body, and 45 ft. 10 in. over all. The extreme width is 8 ft. 6 in. Seats are provided for 43 passengers.

Plate window glass and automatic sash openers are placed in each of the 12 cars.

Other apparatus includes a small Baker heater, Christensen air brakes in connection with Eames vacuum brakes, and the Leverich pattern of draw bars.

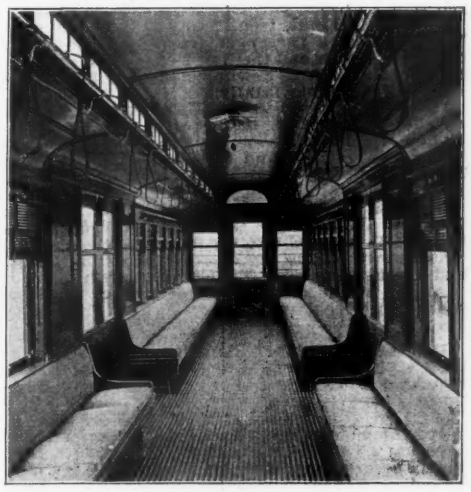
The car body is mounted on McGuire No. 28 trucks, with Taylor 36-in. steel-tired wheels and steel axles.

An English "Light Railway."

The British Board of Trade has just issued its order permitting the building of the Crowland & District Light Railway, a railroad to be built between Peakirk, in the county of Northampton, and Postland, in the county of Lincoln, about 8½ miles, and from the conditions set forth in the order one can get an idea of the degree to which the very strict and severe regulations for building and operating standard railroads in England have, under the law of 1896, been relaxed, in order to permit the construction of lines where a standard railroad would not be profitable.

Perhaps the most interesting features of the specifications for this road are those brought together in a "schedule," or supplementary note, at the end of the order. In this it is provided that the rails must weigh at least 56 lbs. per yd.; on curves of less than 594 ft. radius a check rail (guard rail) must be provided; if flat bottom rails and wooden sleepers are used fang bolts must be used at the joints, or else double spikes on the outside with a bearing plate; on curves of less than 594 ft. radius the same must be provided on every sleeper, on the outside of the outer rail, and there shall be iron or steel ties at suitable intervals to hold the track to gage. Turntables are not required, but tender engines must not be run tender foremost more than 15 miles an hour. The Board of Trade may require electrical communication. (Telephone or telegraph.) At stations used as meeting points there must be a home signal in each direction, and if this cannot be seen 80 rods off there must be a distant signal. These signals may be worked from the station by wires or otherwise. Signal arms must be weighted to go to danger if a connection breaks. The requirement for interlocking is in very general terms; "precautions shall be taken to the satisfaction of the Board of Trade to insure that no signal can be lowered unless the points are in the proper position and that two conflicting signals cannot be lowered simultaneously." Platforms must be provided unless the passenger cars have convenient steps for passengers on the ground. The company is not obliged to provide shelter at any station.

The more formal clauses, constituting the main body of the order, have to do with the incorporation of the company, organization of directors, etc., power to take land, protection of adjoining land holders, rates for freight and passengers, raising capital, etc. One section requires the gage to be 4 ft. 8½ in., and the motive power must be steam or such other motive power as the Board of Trade may approve. The power for the compulsory purchase of lands ceases after two years. The company shall not purchase or acquire more than nine houses occupied by the laboring class. "Laboring class" means mechanics, artisans, laborers and others working for wages; hawkers, costermongers, persons not working for wages, but working at some trade or handicraft without employing others except members of their own family, and persons other than domestic servants whose income does not exceed 30 shillings a week.



Interior of Motor Car for Brooklyn Elevated.

If the road is not completed within three years the uncompleted portion can be finished only by authority of the Board of Trade.

Section 22 provides for very limited deviations in the lines or grades shown on the plan, all subject to the approval of the Board of Trade; the grade of highway approaches must not be made steeper; the grade of the railroad must not be made more than 1 per cent.; the height of embankments must not be increased more than 10 ft. Only the main track, or main tracks, if a second one should be laid, may be laid across a level road crossing. At eight specified crossings the company must have gates, closing across the track except when a train is passing, and employ a proper person to open and close the gates. The Board of Trade seems to be empowered to authorize the establishment of gates without attendants, the trainmen opening and closing them. Where a highway is disturbed the company shall restore it and for 12 months shall keep it in repair. Bridges over or under highways must be maintained by the company.

At Peakirk connection is to be made with a side track of the Great Northern, and elaborate provisions are made, giving the Great Northern full authority to dictate practically all the arrangements. It may change the point of junction if it see fit, may put up all necessary signals at the junction and appoint the necessary signalmen; may control and manage the whole, but all at the expense of the light railroad company; and the latter must provide all necessary side tracks at the junction, to the reasonable satisfaction of the Great Northern. Disputes concerning the work at the junction shall be referred to the President of the Institution of Civil Engineers as referee, or to a person appointed by him. Similar stringent provisions are made for the junction with the standard railroad at the other end of the line (Postland).

Section 30 contains provisions against damaging the canals, ditches, drains and other water works managed by the North Level Commissioners, and Section 31 similarly protects the Newborough Drainage Commissioners. The necessary bridge over the Folly River is described in considerable detail and the permissible disturbance of the banks of the river is carefully limited. The Engineer of the Commissioners must superintend and approve all work. Disputes must be referred to an arbitrator to be appointed by the Board of Trade, and his decision shall be final.

The road shall not be opened for business until after inspection and approval by the Board of Trade, 30 days' notice in advance being given to the Board. If the Inspector reports in writing that the opening of the road would be dangerous the Board may order the company to postpone; disobedience of the order is punishable by a fine of £20 a day.

The company must provide three stopping places, with convenient approaches, at and from which traffic of all kinds shall be forwarded and received, but, as above stated, no building is required.

No engine or car shall have more than 12 tons on one pair of wheels; no train shall run over 25 miles an hour, or over 10 miles an hour on a curve of less than 594 ft. radius. The Board of Trade may order continuous brakes for passenger trains. If other than steam motive power is used the Board of Trade shall make regulations for the reasonable protection of the public; if the Board thinks a proposed mechanical power is dangerous it may forbid or restrict its use. Any person owning, working or running carriages on the railroad shall be subject to the same provisions as the company itself. If electric power is used the company must employ either insulated returns or uninsulated metallic returns of low resistance; it must take all reasonable precautions against injuring any gas or water pipe or other metallic structures by fusion or electrolytic action, and against interfering with telegraph or telephone wires, etc. The Board of Trade, in regulating these matters, shall have regard to the expense involved and to the effect on the commercial prospects of the railroad. There are similar provisions against interfering with Government telegraph wires; willful interruption of telegraphic communication incurs a penalty of £50 a day. Interference by induction or in any manner comes within the provisions of this section.

The company may demand and take, for the use of the railway by any other company or person with engines and carriages, "such reasonable tolls as they think fit."

The company's freight classification shall be the same as that of the Great Northern and the maximum rates of the Great Northern shall apply; but a separate tariff is given for parcels weighing less than 500 lbs. each, carried by passenger trains. For a parcel weighing 7 lbs. 3d. may be charged; for a parcel weighing more than 56 lbs. the company "may demand any sum they think fit."

The maximum first class passenger fare shall be 3d. a mile; second class, 2d.; third class, 1 penny. These restrictions do not apply to special trains.

The capital shall be £45,000, of which £15,000 may be preferred, but the guaranteed dividend must not be over 5 per cent. The company may borrow £15,000 on mortgage, but the amount borrowed must not be more than one-third the amount of capital issued and at least half paid for; one-fifth part of each separate share must have been paid in before it was issued. Stringent provisions are made against fictitious or irregular issues.

Mortgagees may have a receiver appointed if interest is not paid. Debenture stock may be issued subject to the law of 1863. The company may pay interest out of capital during construction, but this must be done under the strict regulations laid down in the order, and notice that the company has power so to pay interest must be given in every prospectus or advertisement inviting subscriptions and in every

certificate of shares. Money raised according to the foregoing clauses must not be used to pay the parliamentary fee which accompanies the application for a charter. This parliamentary fee, which must be raised by the promoters beforehand, is £1,750; it cannot be repaid until the railroad is open for the public convenience of passengers; but the court may order a portion of the deposit refunded when a portion of the road is finished. If the road is not built within the time limited the court may use this fund for compensating the land owners or others who have been damaged. Section 64 provides for arbitration of disputes under a number of clauses and Section 65 provides for a general penalty for non-compliance with the provisions of the order.

In an order issued by the Board of Trade for another light railroad, the Wrington Vale, a six-mile line in Somerset, the Board requires each engine to be furnished with a bell.

The Board of Trade has recently authorized the working, as a "light railway" of a part of an existing railroad. It is the Carmillie Branch of the Dundee & Arbroath Joint Railway, Scotland.

Train Accidents in the United States in July.

COLLISIONS.

Rear.

2d, on Pittsburgh, Cincinnati, Chicago & St. Louis, at Skelly's, O., an empty engine ran into the rear of a preceding freight, wrecking the caboose. Two men were injured.

10th, 8 p. m., on Savannah, Florida & Western, near High Springs, Fla., a train carrying wounded soldiers ran into the rear of a preceding train and one car in the hospital train was wrecked, but none of the soldiers was injured.

11th, on Norfolk & Western, at Lockburn, O., a local freight train which had stopped on a bridge was run into at the rear by a following freight train and the caboose was wrecked. The caboose and the bridge took fire, but the flames were soon extinguished. The fireman was injured. It is said that the foremost train had neglected to send out a flag.

18th, on Louisville, Evansville & St. Louis, near Georgetown, Ind., an empty engine of which one pair of wheels had run off the track was run into at the rear by a following passenger train, and both engines and the baggage car were badly damaged. The passenger engineman and one passenger were killed and a man riding on the front end of the baggage car was fatally injured. It is said that the engineman of the empty engine had neglected to flag the passenger train, "because he thought he should be able to get his engine back on the track before the passenger train arrived."

19th, on Wadley & Mt. Vernon road, at Wadley, Ga., a passenger train ran into a platform car which had been left standing on the main track, and the engine was ditched. The engineman was injured.

21st, 4 a. m., on Baltimore & Ohio, at Neff's, O., an empty engine ran into the rear of a passenger train which was standing on the side track; one passenger and one trainman injured.

21st, on Delaware, Lackawanna & Western, at Scranton, Pa., a freight train standing in the yard was run into at the rear by a following freight, and a caboose was wrecked. The conductor was killed and a brakeman was injured.

24th, on Chicago, Burlington & Quincy, near Camp Point, Ill., a freight train which had stopped to take water was run into at the rear by a following passenger train, and the engine, mail car and caboose were badly damaged; fireman fatally injured.

26th, on Atchison, Topeka & Santa Fe, at Belton, Tex., a freight train was run into at the rear by a following passenger train, and the caboose was wrecked; engineman injured.

29th, on Missouri Pacific, near Stella, Neb., passenger train No. 2 ran into some freight cars which had been blown off a side track, making a very bad wreck. The engineman jumped off and was fatally injured.

29th, on Central of New Jersey, at Glendon, Pa., a passenger train ran into the rear of a preceding freight which was entering a side track; engine and caboose badly damaged. The fireman was injured.

31st, on Erie & Pittsburgh, near Sharpsville, Pa., a freight train ran into the rear of a preceding freight. One engine fell into the ditch and an engineman was injured.

And 21 others on 16 roads, involving 5 passenger and 28 freight and other trains.

Butting.

2d, on Georgia road, near Grovetown, Ga., butting collision between an empty engine and a work train, which was running with platform cars in front. One engine and several cars were wrecked; 1 employee was killed and 10 were injured, 2 of them fatally.

3d, on Illinois Central, near Clark Station, Ky., butting collision of freight trains, both going at full speed. The collision occurred on a trestle, and both engines and 34 cars fell to the ravine below. One engineman was killed in the wreck, but the other trainmen all jumped off before the trains ran upon the bridge; four of these were injured. It is said that the eastbound train disregarded a meeting order.

5th, on Chicago, Burlington & Quincy, near Villisca, Ia., butting collision between a stock train and a work train, badly damaging 2 engines. Two firemen, both on the stock train, were injured.

9th, on Baltimore & Ohio, at Foley's, Pa., butting collision of freight trains, damaging both engines and several cars. One fireman was killed and 5 other trainmen were injured.

10th, on Southern Pacific, near Bealville, Cal., butting collision between a passenger train and an empty engine, badly damaging both engines. One engineman and 2 firemen were injured.

11th, on Illinois Central, at Meadow Lawn, Ky., butting collision of passenger trains, badly damaging both engines. A fireman was injured. It is said that the southbound train ran past a station where it had been ordered to wait for the other. The engineman of the northbound train saw the other in season to stop his train and move it back a short distance.

13th, on Louisville & Nashville, near Jefferson, Ala., butting collision of freight trains, wrecking both engines and several cars. One of the enginemen was killed and 6 other trainmen were injured. It is said that the conductor and engineman of the southbound train forgot that the northbound train was due.

15th, on Chicago & Northwestern, at Green Bay, Wis., butting collision of switching engines, both running backwards. The tenders were badly damaged and one engineman was injured.

16th, on Central of New Jersey, near Califon, N. J., butting collision between a work train and a switching engine, both engines running backward. The tenders were crushed and the engines badly damaged. A part of the wreck took fire and was burned up. One engineman and 1 fireman were injured.

16th, on Pittsburgh & Western, at Carbon, Pa., butting collision between a freight and a work train, badly damaging both engines; 6 trainmen injured.

29th, on Missouri Pacific, near Wichita, Kan., butting collision between a passenger train and a mixed train, due to disregard of orders by the men in charge of the passenger train. One trainman and 6 passengers were injured.

29th, on Illinois Central, at McComb City, Miss., several cars of a switching freight train eluded control and ran some distance on the main track, meeting passenger train No. 32. The passenger engine and the freight cars were badly wrecked and the engineman and fireman were killed. A brakeman was injured.

30th, on Burlington, Cedar Rapids & Northern, at Estherville, Ia., a passenger train ran over a misplaced switch and into the head of a freight train standing on the side track, wrecking both engines. The fireman of the passenger train was badly injured .

And 6 others on 6 roads, involving 2 passenger and 10 freight and other trains.

Crossing and Miscellaneous.

3d, on Oregon Railroad & Navigation road, at Baker City, Ore., collision of passenger trains; 1 man killed.

6th, on Philadelphia & Reading, near Harrisburg, Pa., some cars which escaped control on a side track ran upon the main line and collided with a freight train, wrecking several cars and damaging 1 engine. A fireman was killed and 3 other trainmen were injured.

7th, on Pittsburgh & Lake Erie, near Pittsburgh, Pa., collision between a freight train and a switching engine, doing slight damage. A man crossing the track was injured.

8th, on Philadelphia & Reading, at Nicetown, Pa., a freight train ran over a misplaced switch and into a switching engine standing on the side track, damaging several cars. The conductor was injured.

14th, on the Philadelphia & Reading, near Ashland, Pa., collision between a freight train and a switching engine, one of the engines falling down a bank. One of the enginemen was fatally injured.

16th, at the Union Station, St. Louis, Mo., a passenger train of the Wabash road, outward bound, collided with a passenger train of the Illinois Central which was backing into the station, derailing the Wabash engine and damaging one Illinois Central passenger car.

23d, on Baltimore & Ohio, at Helper's, O., collision between a passenger train and an empty engine; engineman injured.

23d, on Toledo & Ohio Central, at Toledo, O., collision between a freight train and a yard train, badly damaging one engine and several cars; engineman and fireman injured. It is said that the freight train approached on the main line at uncontrollable speed.

25th, on Norfolk & Western, at Circleville, O., collision between a freight train and a switching engine, damaging both engines and several cars. Two tramps were fatally injured.

And 15 others on 14 roads, involving 4 passenger and 25 freight and other trains.

DERAILMENTS.

Defects of Roadway.

22d, on Houston, East & West Texas, near Garrison, Tex., a freight train ran upon a bridge which had been weakened by fire, and the engine and 5 cars fell into a creek. Two employes were injured.

25th, on St. Louis, Iron Mountain & Southern, near Wynne, Ark., a passenger train was derailed at a defective switch and the first 2 cars, with the engine, fell down a bank. The engineman and fireman were injured, the former fatally.

28th, on Baltimore & Delaware Bay, near Kenneydville, Md., a work train broke through a trestle bridge which had been weakened by a flood, and the engine, caboose and tool car fell into the water. The fireman was killed and 5 other employees were injured.

30th, on Louisville, Evansville & St. Louis, near Bartelso, Ill., a freight train was derailed by a loose rail and 12 cars fell into the ditch. A brakeman who was thrown off the top of a car was fatally injured and another employee was less severely hurt.

And 4 others on 4 roads, involving 1 passenger train and 3 freights.

Defects of Equipment.

18th, on St. Louis & San Francisco, near Mound Valley, Kan., a freight train was derailed by the breaking of an axle and the caboose and 2 cars fell down a bank; 2 employees injured.

20th, on Philadelphia & Reading, near Palm, Pa., a freight train was derailed by a broken axle, while crossing a long trestle bridge. The derailed car ran safely across the bridge, but finally fell down a bank, dragging 6 other cars after it.

28th, on Missouri Pacific, near Atchison, Kan., a freight train was derailed by a broken axle and 15 loaded cars were ditched. A tramp was fatally injured.

29th, on Southern California, near San Bernardino, Cal., a freight train was derailed by a broken wheel and 5 cars were wrecked; two brakemen injured.

29th, on St. Louis, Chicago & St. Paul, near Curran, Ill., a freight train was derailed by the breaking of an axle, and several cars were ditched. Two tramps riding in a car of lumber were fatally injured.

30th, on St. Louis, Chicago & St. Paul, near Newbern, Ill., a freight train was derailed by a broken truck and 7 cars fell down a bank. Two brakemen were injured.

And 16 others on 12 roads, involving 1 passenger train and 15 freight and other trains.

Negligence in Operating.

10th, on St. Louis, Chicago & St. Paul, near Oldenburg, Ill., a passenger train was derailed by a misplaced switch and the engine was overturned. The engineman and fireman were injured.

11th, 9 p. m., on Yazoo & Mississippi Valley, near Memphis, Tenn., a passenger train was derailed at a misplaced switch and one trainman was injured.

31st, on Chicago, Burlington & Quincy, near Quincy, Ill., a passenger train ran over a misplaced switch and was derailed. The engineman jumped off and was killed.

31st, 11 p. m., on Baltimore & Ohio, near Glenwood, Pa., a locomotive, which appears to have been started in some way when the engineman and fireman were on the ground, ran uncontrolled to Pittsburgh, where it was derailed at the end of the track in the passenger station. The speed of the engine had become considerably moderated owing to lack of steam.

And 3 others on 3 roads, involving 3 freight trains.

Unforeseen Obstructions.

4th, on Denver & Rio Grande, near Durango, Col., a passenger train was derailed by running over a rock which had fallen on the track and the engine fell down a bank into the Animas River.

6th, on Columbia, Newberry & Laurens, at Columbia, S. C., a freight train was derailed by sand which had been washed upon the track during a heavy shower, and the engine was badly damaged. A trainman was killed.

6th, on Great Northern, near Wagner, Mont., a freight train was derailed by running into a drove of cattle, and the engine and 16 cars were ditched. The fireman was injured and 2 tramps were killed.

14th, on St. Louis, Arkansas & Texas, near Brinkley, Ark., passenger train No. 2 was derailed by running over a cow, and the baggage car fell down a bank. The fireman was killed and the engineman was fatally injured.

23d, on Southern Pacific, at San Francisco, Cal., a passenger train ran into an electric street car at the crossing at Sixteenth and Harrison streets and the engine was derailed. The street car was pushed against a telegraph pole and the motorman was badly injured.

Unexplained.

2d, on Southern Pacific, near Morley, Cal., a freight train was derailed and the engine and 3 cars were wrecked. A brakeman was killed and 3 other trainmen were injured.

7th, on Kansas City, Memphis & Birmingham, near Adamsville, Ala., a freight train was derailed while running at full speed and the engine and several cars were overturned and wrecked; engineman and fireman injured.

8th, on Erie road, at Ridgewood Junction, N. J., a freight train was derailed and the engine and a dozen cars were wrecked. The engineman was injured.

8th, on Toledo, St. Louis & Kansas City, at Silverwood, Ind., a gravel train was derailed and the engine was overturned. The engineman and fireman were killed.

20th, on Wheeling Bridge & Terminal Railroad, in Benwood, W. Va., a switching engine was derailed and overturned, damaging several freight cars standing on a side track. The engineman was injured.

21st, on Manhattan Elevated, Sixth Avenue Line, at Rector street, New York city, the engine of a passenger train was derailed while running through a crossover track.

23d, on Kansas City, Pittsburgh & Gulf, near Kansas City, Mo., a freight train was derailed and several cars were badly damaged. The caboose took fire and was destroyed. Three trainmen were injured.

26th, on Atlantic Coast Line, near Columbia, S. C., a passenger train was derailed on a curve and the engine and several cars fell down a bank. The engineman and 15 passengers were injured.

26th, 10 p. m., on Lake Erie & Western, near Whitmore, O., the caboose of a freight train was derailed and overturned. A brakeman was injured.

28th, on New York & Ottawa, near Moira, N. Y., a passenger train was derailed and 2 passenger cars were overturned; 1 passenger injured.

29th, on Mobile & Ohio, near Scottsville, Ala., a freight train was derailed and two trainmen were killed.

30th, on Norfolk & Western, at Bannon, O., a passenger train was derailed and the engine and first 2 cars were ditched; 3 trainmen injured.

31st, on Southern Pacific, near Benson, Ariz., a pay train was derailed and the engine was overturned. The fireman was killed and the engineman injured.

And 25 others on 19 roads, involving 3 passenger and 22 freight and other trains.

OTHER ACCIDENTS.

4th, on Erie road, at Essex Fells, N. J., the locomotive of a passenger train was wrecked by the explosion of its boiler, and the engineman, fireman and baggageman were injured.

22d, on Annapolis, Washington & Baltimore, near Annapolis, Md., 2 cars of an excursion train were damaged by a telegraph pole on a platform car standing on a side track, and 7 passengers were injured. The man loading the pole on the car failed to control it and allowed it to swing foul of the main track just as the passenger train was passing.

22d, on Southern Pacific, at Dutch Flat, Cal., the engine of a freight train was wrecked by the explosion of its boiler. The engineman, fireman and a coal passer were killed and 4 persons in a hotel near by were badly injured. The hotel was wrecked.

28th, on Cleveland & Pittsburgh, at Steubenville, O., 2 passenger cars in a passenger train were badly damaged by rocks and earth which fell down from a bank as the train was passing. Two passengers were injured. At the point where the accident occurred the cut is about 30 ft. deep, with vertical sides. The rock is composed of shale and coal. After the accident about 10 bushels of shale was gathered up, besides a boulder 3 ft. long. Heavy rains the day before had loosened the rock.

A summary will be found in another column.

British Railroad Returns for 1897.

The financial results achieved by our railways in 1897 were the best that had been realized for a number of years. The percentages as given in the Board of Trade returns are misleading, for the reason that they are calculated upon a fictitious capital. For instance, the amount of the total paid-up capital in 1897 is set down at £1,089,765,000, and compares with a total of £1,029,475,000 for 1896, thus showing an increase of no less than £60,290,000. Out of this large

apparent increase, however, no less than £46,200,000 consists of merely nominal additions to capital. The Midland Company watered its capital to the extent of £34,835,000 during the year by the splitting of its ordinary stock, and there were similar merely paper additions made to the capitals of the Lancashire & Yorkshire and Glasgow & South Western companies. And it is because no allowance is made for the introduction of this large amount of "water" that the proportion of net receipts to capital is made to work out at a lower figure for 1897 than for either of the two previous years. Elsewhere in the returns a statement is given of the total nominal additions to capital made by the various companies so far as these can be ascertained, and by availing ourselves of that we can make the following truer comparison, covering the past three years:

	1897.	1896.	1895.
	£	£	£
Nominal paid-up capital	1,089,765,000	1,029,475,000	1,001,110,000
Amount representing nominal additions	152,476,000	106,345,000	86,495,000
Real paid-up capital	937,289,000	923,130,000	914,615,000
Aggregate net receipts	40,653,000	39,927,000	38,046,000
Proportion of net receipts to real paid-up capital	4.34%	4.32%	4.18%

The following table shows a considerable growth in traffic and in gross revenue, but this was largely neutralized by a proportionately greater increase in the working expenditure:

	1897.	1896.	Increase in 1897. Amount.	%
Mileage—	Miles.	Miles.	Miles.	
Double or more tracks	11,732	11,589	143	1.23
Single track	9,701	9,658	13	0.14
Total	21,433	21,277	156	0.73
Paid-up capital, less nominal additions	£ 937,289,000	£ 923,130,000	£ 14,259,000	1.54
Capital per mile open	43,731	43,384	347	0.80
Receipts—				
Passengers	40,518,100	39,120,900	1,397,200	3.57
Goods	47,807,200	46,175,300	1,631,900	3.64
Miscellaneous	5,361,800	4,822,900	538,900	11.17
Total	93,737,100	90,119,100	3,618,000	4.01
Working expenditure	53,083,800	50,192,400	2,891,400	5.76
Net revenue	40,653,300	39,926,700	726,600	1.82

In the amount of actually paid-up capital there was an increase during the year of 1.54 per cent., which was not much out of proportion to the increase in the new mileage, considering that the augmentation consisted mainly of mileage laid with double tracks or more. The gross receipts show an aggregate increase of 4.01 per cent., but against that there was an expansion of 5.76 per cent. in the working expenses. Consequently the gain in net revenue was only 1.82 per cent., and as this had to be spread over a capital augmented by 1.54 per cent., the percentage of dividends to capital was only very slightly augmented. Still, 1897 was the best year the railways had experienced for a considerable time, and, looking to the falling off that has since taken place, it may be some time before they have an equally good year again.

Passenger Receipts.

	1897.	1896.	Increase in 1897.
	£	£	£
First class	3,210,500	3,133,100	77,400
Second class	2,306,300	2,058,100	248,200
Third class	25,491,900	24,780,300	711,600
Season and periodical tickets	3,027,200	2,914,800	112,400
	34,035,900	32,886,300	1,149,600

Freight Receipts.

	1897.	1896.	Increase in 1897.
	£	£	£
Minerals	19,746,800	18,930,800	816,000
General merchandise	26,737,500	25,901,400	836,100
Live stock	1,372,900	1,343,100	29,800
	47,857,200	46,175,300	1,681,900

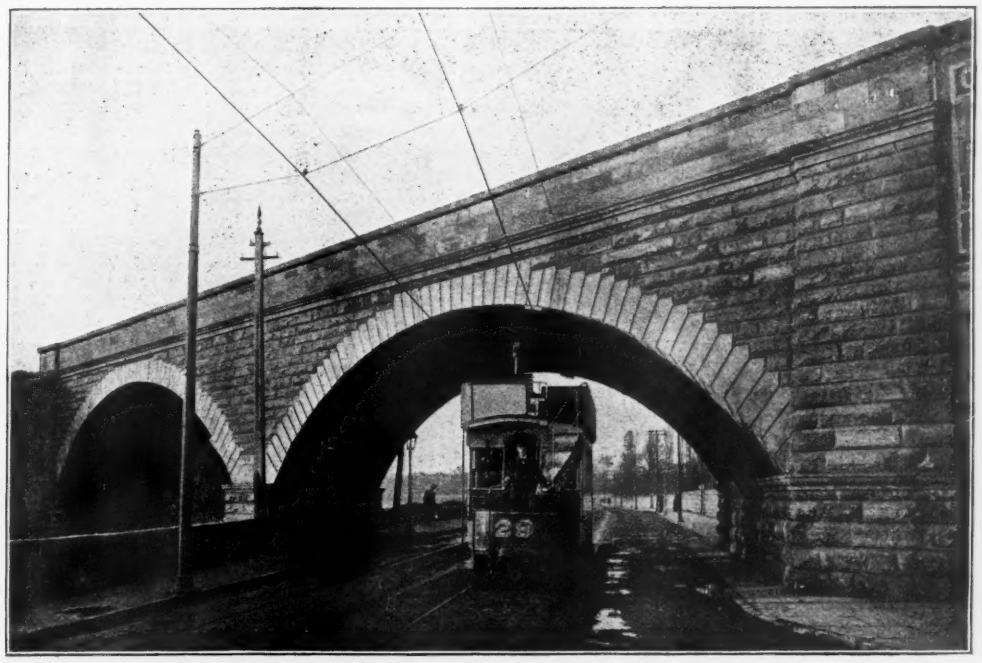
These tables speak for themselves, and the only feature calling for special notice is the growth in the receipts from second-class passengers. Until 1896 that branch of revenue had been steadily declining for years, and by most railway managers the second-class passenger had come to be regarded as a person whom it was needless to cater for. That that was a mistaken policy we have always contended since the time the Midland Company led the way in abolishing second-class passengers. And the success which has attended the efforts of certain companies during the past two or three years to cultivate anew this branch of traffic by a reduction of fares and improved accommodation shows that, properly conducted, it can be made to yield profitable results.—The Economist.

English Electric Railroads—II.

(Continued from page 624.)

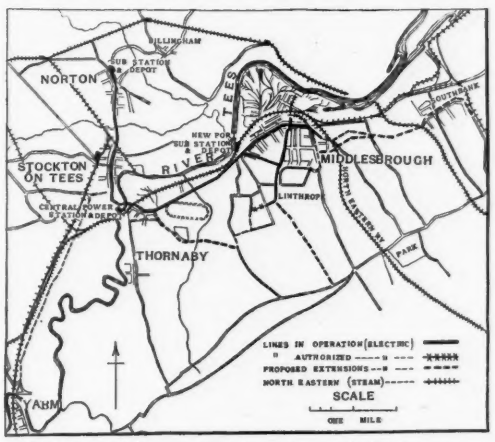
Bradford Municipal Lines.

The municipal trolley lines which have just been opened are only a couple of miles long, but in a few weeks they will be followed by a much larger system of similar lines. On the small section, the average gradient is 1 in 30, though some are as steep as 1 in 14½ and 15½. Girder rails 105 lbs. to the yard are laid, and for about 18 in. on each side of the rails the track is paved with granite setts. The rails are bonded with Chicago crown flexible bonds 5¼ in. long; the contact area of the copper inside the web of the rail is about ten times as great as the sectional area of the copper wire forming the bond. Cross bonds are placed at intervals of 120 ft. In some places the trolley wire is supported on single arm brackets, and in others double arm center poles are employed. The wire is of hard drawn copper .325 in. in diameter, and the line is cut up into the usual half mile sections by means of sectional insulators, which are suspended on brackets. The feeder switch pillar, which is at most points placed above ground, is furnished with six plug switches, test terminals and lightning arresters, the switches being mounted on marble bases. Two of these switches control the feeders, and the other four the trolley wire. The cars were built by the Brush Electrical Engineering Company. They are mounted on Peckham cantilever extension trucks, the length of wheel base being 6 ft. The gage of track is 4 ft. The cars are equipped with two Westinghouse motors fixed on the truck on the Westinghouse suspension system. Single reduction gearing completely inclosed is employed. As usual, the cars have two series-parallel controllers, main and emergency switches and lightning arresters. The Dawson swivelling arm type of trolley is used. The arm is mounted on a cast-steel base, and the vertical movement is controlled by two sets of side springs. The trolley head is completely insulated from the trolley pole, the wheel being of the "West-end" type. The cars are lighted electrically, and are made to carry 22 persons inside and 29 outside. The lighting of the cars is done direct from the trolley wire.



Viaduct and Car on the Clontarf (Dublin) Electric Road.

The Bradford plant is an instance of municipal lighting plant which has been working for some years, being employed for supplying power for the tramway. Multipolar machines are being used, and further such machines are to be put down. A special switchboard has been put up inside the lighting station for tramway purposes. It consists of feeder and generator panels, also the Board of Trade special panel. Each panel has the usual measuring instruments, and an automatic circuit breaker of the Cutter type. The Westinghouse Electric Co. Ltd., of London, carried out the electrical and general equipment contract, Mr. R. Blackwell acting as sub-contractor.



Electric and Steam Roads in and near Middlesbrough, England.

Middlesbrough-Stockton Lines.

The new trolley lines connecting the towns of Middlesbrough, Stockton-on-Tees and Thornaby, as shown in the accompanying map, are the most important, for some reasons, of all recent English systems.

The horse and steam trams have given place to the overhead trolley, and the reconstruction has been done on the 3 ft. 6 in. gage of track, whereas there were formerly some 4 ft. and others 4 ft. 8½ in. The tracks are paved with whinstone and granite setts from Norton to Thornaby, and with scoria blocks throughout Middlesbrough. Much is made of the fact that 15 miles of track was completed in less than six months. It is certainly a record, that within 18 months of the completion of the negotiations with the local authorities the lines are opened. The systems are owned by the Imperial Tramways Co., and they have been laid out and constructed under the personal supervision of Mr. J. Clifton Robinson, managing director and engineer to the company, whose name is very closely associated with the development of electric traction in England, particularly with the Bristol and Dublin systems. The Middlesbrough line is made up of 6½ miles of double track, and various small single sections. In addition to the 15 miles, it is proposed to add 20 miles of additional track to the system. Upon a solid foundation of 6 in. depth of Portland cement concrete, 6 in. steel girder rails are laid in 30 to 36 ft. lengths, the weight being 92½ lbs. to the yard. At every 10 ft. the rails are tied to gage by steel bars, and the joints are secured by specially designed fish plates. The rails are bonded with double copper bonds of the Columbia 0000 type, and at intervals of 120 ft. the tracks have copper cross connections. When the rails were thus laid the whole surface was floated in cement. The gradients are comparatively easy, though at one point there is a 1 in 18 climb.

The central power station is conveniently located close to Victoria Bridge, Stockton-on-Tees. A wharf has been erected with a river frontage of 200 ft., at which coal and other stores will be landed. An electric crane on the wharf is used for discharging coal from the vessels, the coal being first put into a hopper, where it is weighed in three-ton lots. After weighing, it is automatically hoisted and discharged by an elevator into the storage bunkers, from which it is fed by gravity into the hoppers of the mechanical stokers and so into the furnaces. About the center of the wharf a cast-iron cased pump, with cut-off valves, is placed for the efficient supplying of the condensing plant. In the engine room the wall is divided into arched panels, over which a stone cornice, running the full length of the room, carries a 10-ton overhead traveling crane. The condensing and pumping plant is arranged on the basement floor, and all steam, condenser, suction and other pipes and connections being also carried below the floor line, a clear space is obtained around the engines and generators. The engine foundations, of which there are three, are built in solid concrete from the basement floor level. In the boiler room there are three Babcock & Wilcox water tube boilers, each having a heating surface of 3,580 sq. ft., and being capable of evaporating 12,000 lbs. of water per hour. The steam and water drums are 22 in. in diameter and 23 ft. 1 in. long, the cross drum is 24 in. diameter and 90 in. long, and carries an 8-in. stop valve. Each boiler furnace is equipped with a Vicars mechanical stoker, worked by an electric motor. The coal storage bunkers are of steel, supported on steel columns, and have a total capacity of about 300 tons. The conveyor can handle 20 tons per hour. In the flue is placed a Green's economizer of 240 tubes. The boilers supply steam to three Reynolds-Corliss horizontal cross-compound condensing engines of 400 h. p. each, made by the E. P. Allis Co., of Milwaukee. The cylinders are 16 in. and 32 in. diameter, with 36 in. stroke, the engines running at 94 revolutions per minute. Each engine is directly coupled to a 300 k. w. three-phase generator. A surface condenser, having combined air and circulating pumps, is provided for each engine. Water

is drawn from the River Tees for the condensers, and the two boiler feed pumps have steam cylinders 7½ in. diameter by 6 in. stroke, and pump cylinders 4½ in. diameter. The suction pipe is 14 in., and the discharge 13 in.

Extensive car sheds have been erected on part of the site formerly occupied as a steam tramway depot. Pits are excavated the full length of each car track (of which there are seven), thus enabling proper examination to be made of every car standing within the sheds. One of the pits is provided with a hydraulic jack on a traveling carriage, facilitating the ready manipulation of the heavier parts of the equipment, and capable of lowering a truck bodily. All these buildings, as well as the car pits, are lighted by electricity. New double tracks have been laid throughout the sheds, with the necessary points and crossings. An accumulator house adjoins the car shed. It contains a battery of 260 cells for lighting the engine and boiler rooms, sheds, repairing shops and offices when the engines are stopped, also providing power to start running each morning and for line inspection purposes. The cells are of the Tudor type, and have a discharge rate of 48 to 70 amperes, the capacity at the lower discharge rate being 240 ampere hours.

There is a sub-station in Newport, 2½ miles from the central station, and an electrical transforming plant is in position there.

The three 300 k. w. three-phase alternators are of the 32-pole type, 2,500 volts, giving a frequency of 25 cycles at 94 revolutions per minute. The fields are excited from the 500-volt bus bars. For charging the accumulators, a booster is connected in series with the 500-volt bus bars. This booster consists of a rotary converter, fed from step-down transformers of a special design. Each transformer has the primary and secondary separated so as to give the effect of a considerable reactance, this arrangement giving a large range of voltage on the rotary converter to provide for the alteration in the charging volts required by the cell. Rotary converters are of comparatively recent introduction in England.

This distribution system gives the maximum of power at any point of the system on the most economical basis. A 500-volt continuous current direct from the rotary converters in the main station feeds the trolley lines for two miles on either side of the station, while the Middlesbrough and Linthorpe sections of the lines are fed by a current transmitted at 2,500 volts from the main station to the sub-station at Newport, and there transformed down so that the power is delivered from this sub-center direct into the line at 500 volts. The considerations leading to the adoption of this method of distribution have reference not only to the position of the main generating station and the properties otherwise available, as car sheds, machine shops, etc., but to the length of the line and the regulations of the Board of Trade as to the earth return. The Board of Trade regulation with respect to the return is that the difference of potential between the generating station and the extreme ends of the line shall not exceed seven volts. With the number of motor cars to be operated on the lines in the borough of Middlesbrough, had the current been supplied at 500 volts direct from Stockton, the drop in the earth return between the termini at Linthorpe and Ormesby Road and the Stockton main station might have exceeded the prescribed limit, and in order to secure compliance with the Board of Trade's regulations, the sub-station was established. A further advantage lies in the comparatively small amount of copper required in the feeders conveying current to the trolley wires. The seven volt limit in the earth return is fixed for the purpose of protecting gas and water pipes against electrolysis. The feeder cable transmitting the 2,500 volt current from the main station to the sub-station consists of two core cables, in each of which are three insulated copper conductors, each having an area of 50 sq. millimeters, or .0775 sq. in. With this small section it is possible to transmit 500 k. w. with a loss of less than 5 per cent. At the sub-station this current is reduced by step-down transformers of 80 k. w. capacity to 320 volts; and this current is then passed into the alternating current side of the rotary converter, from which a direct current of 500 volts is drawn to feed the portion of the line supplied from the sub-station. The two four-pole rotary converters of 200 k. w. capacity running at 750 revolutions per minute, in the main station, feed direct into the portion of the lines supplied from that point, and three similar machines are located at the sub-station, from which distribution is made to the remainder of the system. A novel feature of the main station equipment is a combination of static and rotary transformers for charging the batteries.

In some roads center poles are used, and in others the side pole and bracket system. The poles are placed at an average of 120 ft. apart.

The trolley wires are of .000 hard drawn copper .364 in. in diameter, and divided by sectional insulation. There are overhead points and crossings at the ends of the lines and at the branches leading into the main and sub-stations, and on the lines as well as in the sub-stations the cars are moved and handled entirely by the trolley. The half mile section pillars (cast iron) are about 4 ft. in height, and are placed on the curb lines, so that they are accessible from either side. The whole of the electrical plant and equipment was supplied under contract by the British Thomson-Houston Co., and the installation has been specially supervised by their consulting engineer, Mr. Horace F. Parshall.

The motor cars will seat 60 passengers. They are mounted on four-wheeled bogie trucks of the maximum traction type, and each truck carries one G. E. 800 motor, the motors being connected up to series parallel controllers, K-2 type, one on each end of the car.

It should be mentioned that this is the last trolley line opened in England, and those who are acquainted with English systems consider that this stands out as the model line.

Halifax Municipal Lines.

There are two special points which make the new trolley system at Halifax stand out prominently in English practice (1) the very steep gradients which have to be met, and (2) the fact that the trams are worked from the municipal lighting plant as in the case of Bradford. The lighting plant at the power station comprises several sets of 100 k. w. and 50 k. w. alternators, and one 350 k. w. set, and the system embodies a sub-station and the use of house transformers. This plant had been working for several years before tramways were put down by the municipality, but in designing the power station the engineer had regard to the prospect of electric traction developments, and in consequence the buildings had not to be extended to admit of the traction plant. The tramway generator is solidly built and driven by means of ropes, the makers being the Electric Construction Co. of Wolverhampton. The generator is of the four-pole type, having an output of 220 amperes at 500 to 550 volts. The engine which drives this generator formerly drove one of the lighting alternators. A heavier flywheel has been substituted and this increases the weight 100 per cent. In one corner of the station there is a motor alternator to act as an intermediary between the lighting and traction systems. It consists of a continuous current machine connected by ropes to an alternating current motor. By driving this set from the alternating current circuits the continuous current machine will be able to supply energy to the car circuits. A battery of accumulators, 270 chloride cells, will act as a flywheel to the whole system, will run the tramway service during the heavy lighting demand, and will run the early morning cars; and by reversing the motor, it will run the alternating lights during the hours of light load. The battery will discharge 150 amperes for 9 hours, 200 amperes for 6 hours, and 300 amperes for ¾ hours. The battery is charged by means of a motor-driven booster which adds 150 volts to the traction bus bars. The switchboard has six panels for feeder, generator, motor alternator, battery and booster, Board of Trade requirements, and for voltmeters. The feeder and generator panels have automatic cut-outs. Instruments for testing the fall of potential in the rail are fixed in a sub-station.

One section of the line, known as the Gibbet street section, 1½ miles in length, rises over 375 ft., or an average gradient for this distance of 1 in 20. On the ascent there is a demand for considerably above the normal current, but on the descent this is made up for by the fact that no current whatever is used. As a matter of fact, on the descent great precautions have had to be taken by the provision of slipper and electric emergency brakes, as well as the ordinary hand brake. The gage of track is 3 ft. 6 in., and girder rails, 98 lbs. per yard, are used. No. 0000 Columbia rail bonds are employed, and at every 90 ft. cross bonds are fixed. The trolley wires are of 0 gage, .324 in. diameter, carried on side poles placed 40 yds. apart. Armored feeders (two in number) run to a sub-station in the center of the town. They have .15 sq. in. sectional area, and the return feeder is drawn in Doulton ware casing. Switches controlling the various sections of the line are placed in the sub-station, which is, in fact, an extension of a transformer lighting station. The cars are mounted on Peckham type trucks, having a wheel base of 5 ft. 6 in., each car having two E. C. C. inclosed motors, K-type series parallel controllers. The Dickinson type trolley is used. There are outside seats, and the weight of each car, with 44 passengers, is about seven tons. The present length is 6½ miles, but an extension of 7 miles is being built.

Lines Constructing.

The above are several lines which are now running, having been opened within the past few weeks. For the future the outlook is very promising. The next few months will see the completion of the much talked-of Springburn section of the world renowned Glasgow municipal trams. The Liverpool municipal lines, also experimental and short, are approaching completion also, and here the work possesses more than usual interest, inasmuch as nearly everything is being specially designed. There will be cars from Germany and cars from America, placed alongside with a specially designed car expressly made for Liverpool. There is to be a special trolley pole and so on. Then at Manchester there is promise of as extensive a system being put down by the municipality for working electrically all the city and suburban lines. The necessary rights have been secured, and it is a matter of only a short time now. The St. Helens, Hull, Plymouth and many other places are now laying the tracks for trolley cars, and where actual construction work has not been commenced there are powers either already obtained or in process of being secured.

The Underground Railroads (London).

These have been so carefully watched and treated in the Railroad Gazette that little or nothing can be said that will be new to the readers of that journal. A few main facts may, however, well be repeated.

Sir J. Wolfe Barry and Mr. W. H. Preece are studying the matter of electric working for the directors of the Metropolitan and the Metropolitan District. The remarks of the chairman of the Metropolitan District to the shareholders are interesting: "We have got a term of years to think it over, and when we have felt our way we can turn our minds to the bigger question, when probably it may be more easy to raise £1,500,000 or £1,600,000 for such an object than it is at present." Confronted by this spirit the investing public naturally held back when the Great Northern & City scheme was placed before them for the second time to subscribe a million and a half pounds. The scheme has just been brought before investors for the third time, with dividends guaranteed on all the capital during construction and for three years after the line has got to work.

A new scheme recently brought out in the form of a prospectus is the Brompton and Piccadilly Circus underground electric, with a share capital of about three million dollars. It would be a two-mile line, double tracks in twin tunnels, seven stations. As in all other such schemes, whether completed, constructing or on paper only, the Greathead tunnel system is proposed.

The Central London is making progress. The tunnelling is in a well-advanced state, but the operations at the Bank Station have presented great difficulties and caused considerable delay; but the large gas and water mains have now been removed and replaced in a new subway. The engineers hold out the hope that the line will be completed by June, 1899.

The City & South London report for the first half year (1898) shows a growing traffic, though the ordinary dividend cannot reach above about 2 per cent. until the new extensions get to work. One of the tunnels for the extension into the city is nearly complete, and the work for the extension tunnel to Clapham, at the other end of the line, will be finished in about three months. It is expected that the entire road from Clapham to Finsbury Pavement, E. C., will be opened for traffic some time next year. The company is now arranging to raise money for its City & Brixton electric underground, which we have already detailed in the Railroad Gazette. The working expenses of the City & South London line have dropped further this half year; they are now 56.67 per cent., and the expenses per train mile have dropped from 1s. 4.22d. to 1s. 3.92d. Locomotive expenses are down from 6d. to 5.8d., and traffic expenses from 6.25d. to 6.03d. The receipts are on the increase. The first year the line was opened the working expenses were 79.7% of the receipts, while last year they were only 56.7%, which says much for the management of the line.

Physical and Mental Examination of Railroad Employees.

This was the subject of a paper by Dr. Granville P. Conn, of Concord, N. H., Division Surgeon of the Boston & Maine, which was read at the last meeting of the Association of Railroad Surgeons at Toronto. Dr. Conn reviewed the legal and practical aspects of the subject, summarizing his views as follows:

The law holds railroads liable for damages due to the employment of ignorant or incompetent men, and fellow servants have the same rights in court as the public, where they are injured by inefficiency or incompetency of employees. As 3.73 per cent. of the men examined for the United States Army were rejected (in the war of the rebellion), on account of spinal deformities, heart disease, defects in vision and diseases of the ear, surgeons have a duty to warn railroad officers to take more care in examining candidates for employment. An applicant for the position of trainman should be as thoroughly examined, physically, as one entering the United States Army.

In the discussion on the paper, Dr. J. H. Curry, of Toledo, O., told of his experience with the laws of certain states which require examinations for color blindness. He did not name the states, but it may be assumed that one of them is Ohio. He says that he has found the most completely color blind persons carrying certificates that they have been examined and are all right for railroad service. The laws are so loose that very imprefect examinations can be made to conform to them.

Dr. W. H. Pepler, of Toronto, replying to the remark of another speaker, that surgeons should attend to their own business, said it was a part of their business to see that their employers, the railroads, employed the best men. Moreover, they should urge the adoption of suitable examinations and the training of new men. Nearly 50 per cent. of the accidents to men on the Canadian Pacific are to new men who have not had a day's training.

Dr. J. B. Hungate, of Weeping Water, Neb., related

a case of a man on the Missouri Pacific who had hernia and who afterward went to work for another company and brought suit for damages, claiming the hernia to be due to lifting a table while in the company's service. Dr. Hungate also called attention to the cases of men who seemed to be thoroughly unfitted for the hazardous work required on trains. He recalled cases of brakemen who were severely injured in freight service three times in close succession. Such men should be detected and rejected at the outset.

Dr. W. D. Middleton, of Davenport, Ia., cited cases of color blind enginemen who had been shielded by their conductors. He had encountered cases of hernia like that described. On his road, the Rock Island, physical examinations are now required, precisely the same as in the military service and in addition an oculist examines the eyes and an aurist the ears. The examination fee is only one dollar. Other speakers spoke of similar small fees, but urged the importance of examination, nevertheless.

Dr. J. M. Dodson, of Chicago, spoke of the importance of physicians training themselves to make physical examinations. The medical schools do not give enough attention to this; the students are more familiar with abnormal than with normal conditions.

The New Dresden Main Station.

The old "Bohemischer Bahnhof," in the capital of Saxony was a shabby affair, but had the advantage of possessing plenty of waste room about it, and of being in itself of considerable size. (It may be remarked in passing that 7 per cent. of the entire area of Dresden is taken up by railroad buildings and yards, and this means a great deal of space in a city so liberally supplied with public parks and private gardens.)

The present station, to which has been given the name of the Haupt Bahnhof, or main station, in view of the fact that there are four other passenger stations in the city, is one of the finest in Europe, and if the taxpayers can stand it nobody should be dissatisfied, except, perhaps, those who have heavy hand baggage to carry from a way train to one on a through track, or vice versa. The railroad, despite the heavy outlays for such trifles as this station, earns 3½ to 4 per cent. on the cash which it cost the Government for construction and for purchase of private lines.

As to the adaptability of the station itself, considered as a station, to the railroad conditions in Saxony, we must wait until the paint is drier before pronouncing a verdict. The station, which has been 2½ years in building, consists of three main portions—a triple hall (train shed), to the west (to the right in the drawing), and the so-called East Hall, to the left of the Pragerstrasse. In the triple hall the north and the south parts have elevated tracks, with offices, etc., at the ground level, and the middle has tracks on the ground, or street level, or thereabouts. There is also a low arched hall south of all, with two freight tracks. The East Hall has elevated tracks with some offices on the street level, and under the arches of the tracks are stores and offices rented for business purposes—stationery, gentlemen's furnishings, etc.

The North Hall is about 789 ft. x 106.6 ft., with arched roof 54.5 ft. above the tracks, which are 14.8 ft. above the street level. This serves the fast, ordinary and local trains from Bodenbach and Tetschen (Bohemia), and Pirna, Saxony, and to Riesa and Leipzig; also those of the longer line to Leipzig, via Koetzschenbroda, Meissen and Doebeln, and for the line to Berlin via Koetzschenbroda, Roederau and Elsterwerda. There are three tracks, accommodating six trains at once.

The South Hall takes the trains of the same lines in the opposite directions; has three tracks and accommodates six trains at once, if needed.

The main, or central hall, with dimensions of 197 ft. x 610 ft., and six tracks, capable of accommodating twelve trains at once, serves the trains in both directions of the lines, Reichenbach (in Vorgtland) Chemnitz-Dresden and Dresden-Goerlitz (Prussia).

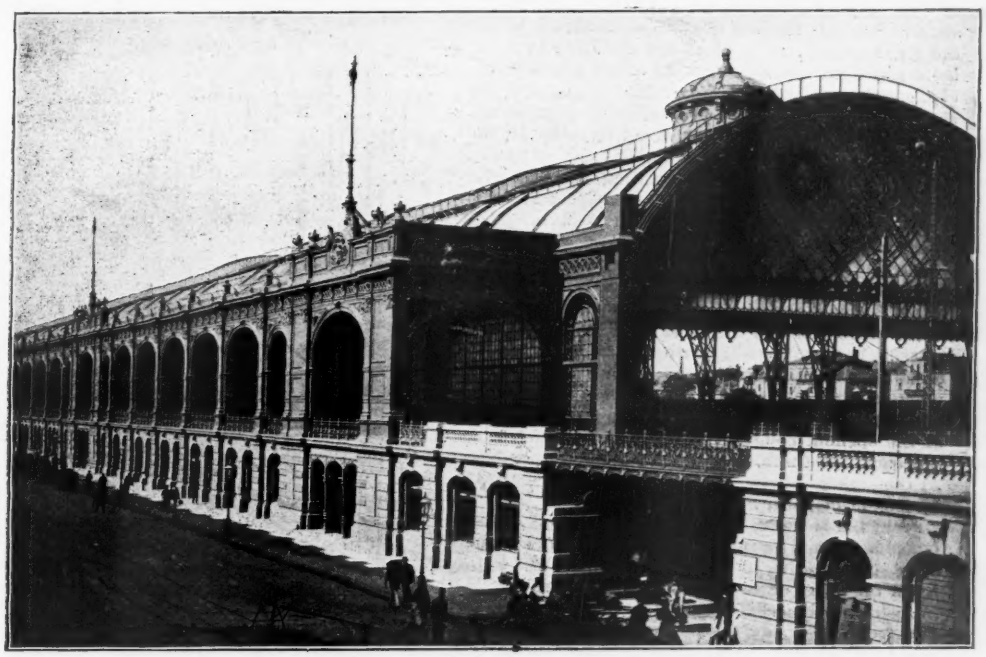


Fig. 2.—Dresden Passenger Station (unfinished) Looking Northwest from Prager Street.
The colonnade at the left is the double-track passage for freight trains.

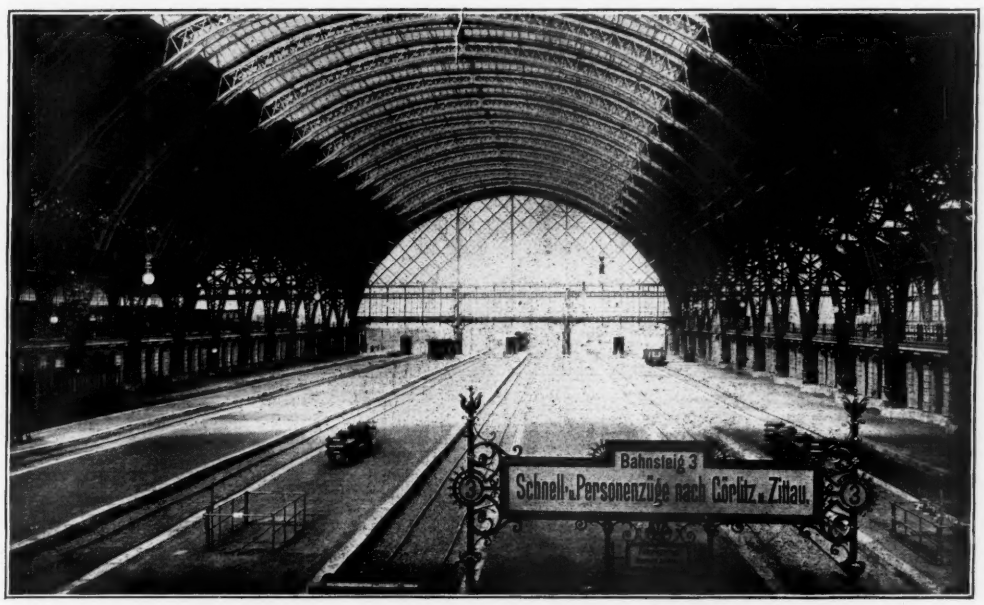


Fig. 4.—Central (low level) Hall (train shed) New Dresden Passenger Station, Looking West.
In the south (high level) hall standing cars may be seen. The tracks in the north hall are vacant.

The East Hall with eighteen tracks, with room for as many trains at once, is for the traffic with the suburban and near-lying towns, Cossebande, Coswig, Weinboebla and Elsterwerda. But eight of the tracks are regularly platformed and assigned to trains.

The open space A in the middle, through which the main street of the city (Pragerstrasse) passes, has an area of about 100,000 sq. ft. The elevated tracks on the east side of this are connected with those in the North and South Halls by seven overhead structures bearing nine single tracks. The entire area covered by the station, exclusive of the open space through which the street passes, is about 500,000 sq. ft., the extreme length of the three western halls, counting stone and iron structures, 789 ft.; the widths for north, middle and south passenger divisions respectively, 106.6, 198.5, and 106.6 ft.; freight hall, 32.8 ft.

Those offices of the railroad direction which have to deal with the general public, are in the middle portion, on the first and second floors; and some on the third. There is on the south side a room for the station surgeon, a room for the sick, and an elevator and litters for the latter. The train crews have a dining room with cook stove, a bath room and large sitting rooms, with good sleeping accommodations handy. There is also all necessary provision for the various employees who shift and clean cars, etc., and for the employees' insurance association.

Lost property is to be reclaimed in the north side; the city collection offices for duty on eatables, etc., in the north and south halls. The royal police have their office in the south hall. There is a barber shop in the outgoing passage of the north hall, and also the south; bath and wash rooms for men north, for women, south; and offices, or counters for money-changing, cigars, chocolate, soda water, etc. Water closets for both sexes are plentiful, and there is good book and newspaper stand. On the southeast corner of the south hall is a fine café, with billiard tables etc.

Coming from the east on the Wienerstrasse, one gets a good idea of the three-fold character of the

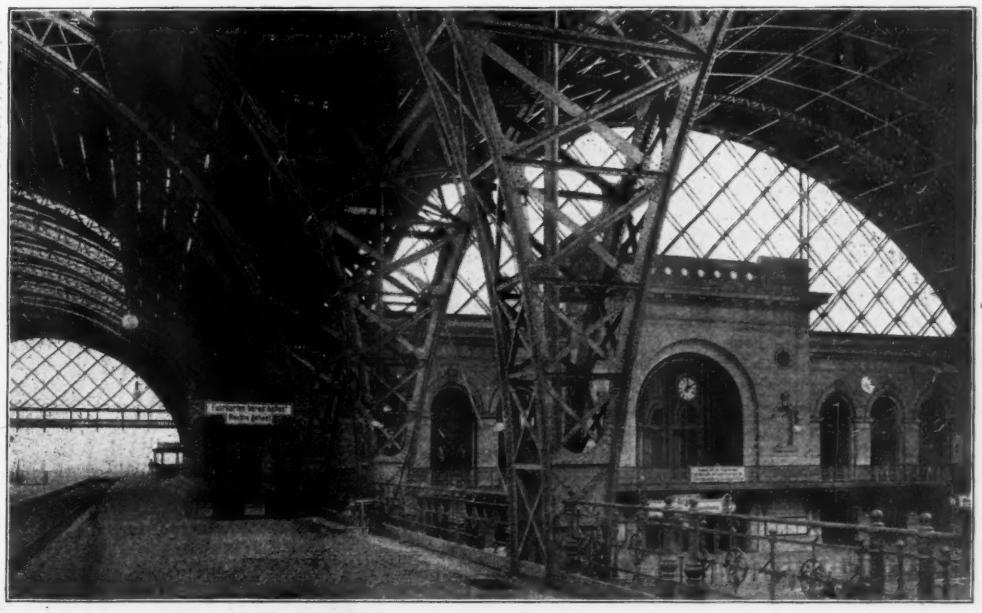


Fig. 3.—View in North Hall (train shed), Dresden Passenger Station, Looking East.

main buildings. The elevated tracks disappear under the great arched roof of glass and iron; and between them stand the vigorous outlines of the main, or reception building. To left and right of this are two square clock towers; then two connecting buildings, each with two Ionic columns and triglyphs. In the center of the main arch is a group of statuary 15.4 ft. high, by Prof. Rentsch, representing Saxonia with her scepter, protecting the civil engineering and mechanical engineering arts. The facade is in sandstone below, rough ashlar above, in smooth surface.

Entering the interior, through the main doorway under the Saxonia group, we find ourselves in the rotunda B, under the great dome, forming the junction of the main hall and the cross hall. The whole impression is that of solidity; there is no imitation material anywhere used; and only a moderate use of the painters' and the plastic arts. The color tone is greenish. There are four rather robust female figures at the opening points of the dome, representing the railroads, telegraph, trade and finance, respectively. At the spring of the arches are 26 coats of arms of the various principal towns in Saxony.

From the entrance door one goes left and right to baggage rooms; opposite these are the ticket windows, T. From the ticket offices the ticket sellers can reach the upper stories by elevators, so that they can make up their accounts in quiet. Entering the station from either the Wiener or the Bismarck street, one finds baggage counters and ticket offices, and water closets in plenty, fitted up in Carrara marble.

From the dome hall into the "through hall," J, one finds, left, rooms for cigar selling, C, and money-changing, D, respectively; then the great waiting room for first and second class passengers, E; to the right two rooms for public telegraph service, F, and for sodawater, G, and then the great waiting room for third and fourth class passengers, H. Each waiting room has connection with the platforms, a reception room for travelers, and a ladies' room. The waiting room for first class passengers is handsomely decorated with Meissen porcelain tile dadoes in blue, after Ludwig Sturm. To the left are pictures of the cities of Bautzen, Leipzig and Zwichan; then Freiberg and Loebtau, Zittan and Plauen in Voigtland are shown, as well as several celebrated bridges and viaducts along the line. One of the walls shows the principal points of interest in Saxon Switzerland, and other of the natural beauties of the country are in like manner depicted.

Two main stairways in the middle hall, K and L, lead right and left to the upper story. Here are two dining rooms for general use, both with arched roofs.

The tracks for the through trains surround the head station as a river does an island. The baggage platforms, with one exception (that of one of the elevated tracks), are entirely separated from the passenger platforms. To get baggage from one baggage platform to another, there is a transverse tunnel with elevators at the west end of the main hall (train shed).

The safety of the cross platform, M, is insured by "sand tracks," which are now so plentifully used in Saxony, and which have already averted several accidents. These supplement and precede the usual buffers.

Leaving the north hall (train shed), through the northern exit, and going to the left, we find the royal entrance and pavilion, N—the latter consisting of three rooms, richly furnished, and with walls in green silk.

The cost of the entire station and approaches is about 80,000,000 marks, or say $19,000,000—quite a sum for a country of only 3,800,000 inhabitants.

The lower story of the train shed is of stone and the upper of iron and steel. This framework is apparently very light, and it remains to be seen if it is heavy enough to withstand the well-known Saxon winds, should they be accompanied by snow.

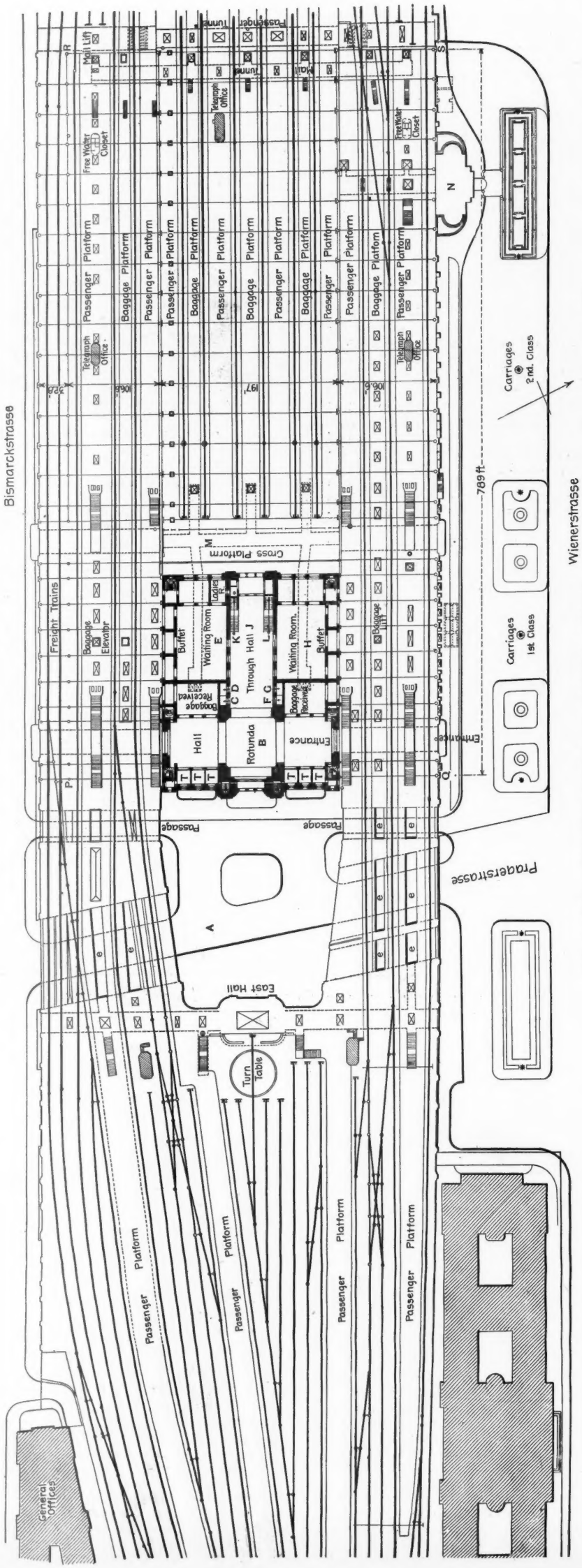


FIG. 1.—NEW PASSENGER STATION AT DRESDEN, SAXONY.

NOTE.—The top of the drawing is south, the bottom north. References. A.—Prager street, crossing beneath the tracks. B.—Junction of main entrances. C.—Cigar stand. D.—Money changer. E.—Waiting room for first class and second class passengers. F.—Telegraph office. G.—Soda water. H.—Waiting room for third class and fourth class passengers. J.—Passageway to trains. K L.—Stairways to second story drawing are on the upper level. In the space occupied by platform M may be seen the dotted line showing the location of passages beneath the floor (extreme right) e. d of the train shed, with elevators, for handling the mails. Adjoining this mail tunnel is another one for passengers. Throughout the drawing elevators are indicated by a double square crossed with two diagonal lines. Parallelograms in single line, crossed diagonally, indicate light shafts. N.—Royal pavilion, entrance for members of the royal family. P, Q, R, S, indicate the extreme limits of the three train sheds. The two tracks outside (south) of P R are for freight trains. These are covered by an ornamental structure shown in perspective in Fig. 2. The term "east hall" is used to designate the whole of the space occupied by tracks to the left of the sidewalk passage beneath the tracks at the left of Prager street. All of these tracks are at the upper level. Eight in the center terminate as in a headhouse, while those at the sides cross the street on bridges and run through the outer train sheds at the right of Prager street. The letter "e" indicates the location of openings for light between the bridges.

A Combined Absorption and Transmission Dynamometer.

Prof. J. J. Flather, of the University of Minnesota, in a paper presented before the American Association for the Advancement of Science at the Boston meeting, described some recent improvements in his hydraulic transmission dynamometer for laboratory work, which was illustrated in the Railroad Gazette of Jan. 22, 1897. To explain briefly, this machine, as shown by Fig. 1, consists essentially of three pulleys, the one on the right being fixed to a hollow shaft and may be used for the belt which connects the dynamometer to the machine to be driven, or it may be used for a brake band; the middle pulley is an idler and runs loose on the shaft, while the one to the left carries the main belt and drives the shaft through a system of hydraulic cylinders shown in Fig. 2. The cylinders, pipes and hollow shaft are filled with oil, so that any resistance to turning produces a pressure in the cylinders. This pressure is transmitted by the oil through the hollow shaft and is recorded by the movement of the indicator pencil, and is also shown by the pressure gage at the opposite end. A very full explanation of the working of this dynamometer was given in the description previously referred to, and need not be repeated.

The most notable feature of the latest dynamometer is the use of a water cooled fixed pulley having a perforated rim, which permits of the use of a brake band for absorbing the power furnished the dynamometer. This pulley, which is commonly used to connect the dynamometer to the machine to be driven, has internal flanges for carrying the cooling water. The rim also is furnished with a number of brass bushings drilled endwise, each being provided with a regulating screw by which the amount of water admitted to the brake is readily controlled. The brake band is a three-ply cotton belt 7 in. wide, connected through three sets of tension springs to the brake regulating screw. It is provided with adjustable casters which permit the weight of the dynamometer to be carried by wheels, or to rest firmly on the floor, as desired. This will be readily understood by reference to Fig. 1.

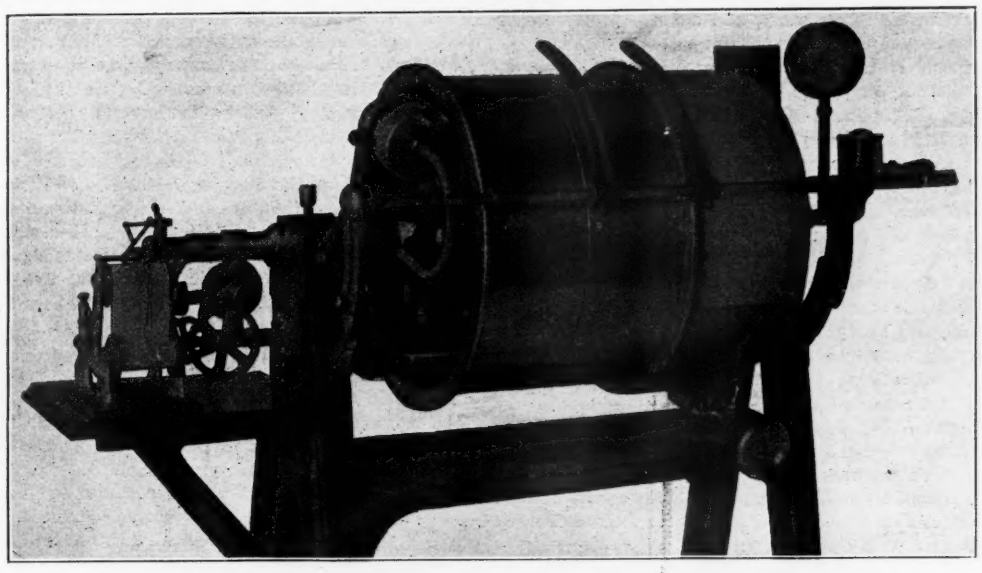
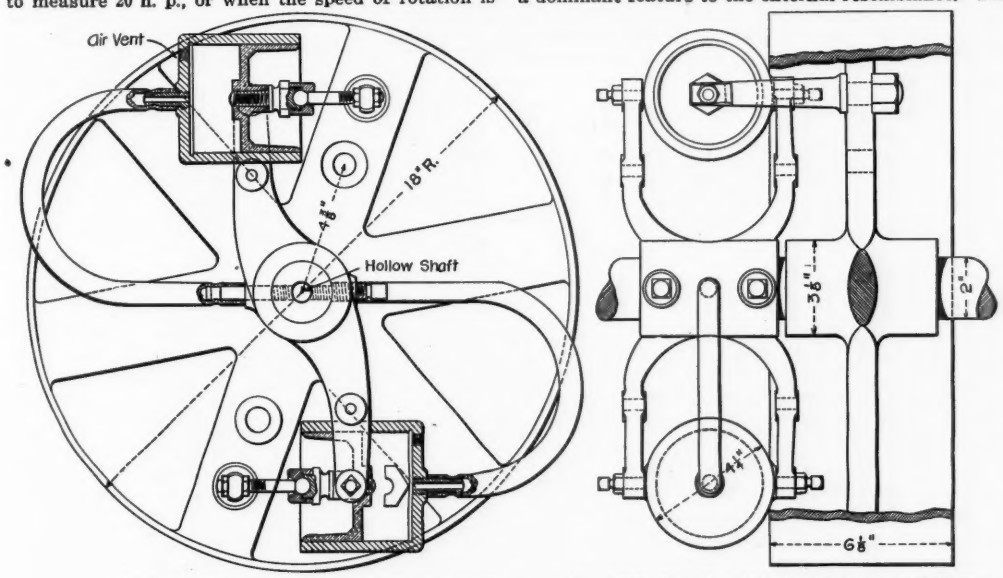


Fig. 1.—Combined Absorption and Transmission Dynamometer—Designed by Prof. J. J. Flather.

will be seen that the brake band may be quickly removed, thus changing the machine from an absorption into a regular transmission dynamometer. In either case an automatic record is obtained on the band of paper, which is caused to pass with uniform motion under the indicator pencil.

A number of changes likewise have been made in the detail parts. Thus in addition to the force curve traced by the indicator pencil, the zero, or datum line is traced by another pencil which is adjustable in position and may be located at pleasure on a line parallel with the axis of the shaft. Thus, one is enabled to measure the total power required to run a given machine or any subdivided part of it. The two cylinders through which the driving power is transmitted are 10 in. in area and are provided with bronze pistons actuated by plunger pins which may be located in either of two positions; in the first machine the position of the cylinders was fixed. The inner position is used for ordinary work, and the outer one for extra heavy work, such as that required to measure 20 h. p., or when the speed of rotation is



Section through Hydraulic Cylinders Seen in Fig. 1. *Part Side Elevation, Showing Position of Cylinders.*

Fig. 2.—Details of Absorption and Transmission Dynamometer.

very slow. Springs of various intensities may be used to transmit the pressure from the shaft to the indicator pencil, depending upon the pressure to be recorded. These springs are changed as in any ordinary indicator.

The work of friction of the plungers in the cylinders is practically eliminated, since the combined area of the plungers is so much greater than that of the indicator piston, and since the indicator motion multiplies the distance moved by the indicator piston five times it will be seen that the motion of the plungers is exceedingly small. The latest machine

Modern Freight Locomotive Practice in Austria

Steep gradients and long ones—and those sometimes over 40 miles in length—short curves, heavy loads, and poor coal, account for much in the design of Austrian goods locomotives of to-day; and as these engines frequently work a mixed traffic or heavy suburban service there is yet another condition, in that they shall be speedy, and quick starters.

Where in England the locomotive superintendent is disposed at times to press into the goods service what would be regarded abroad as powerful passenger engines—a practice which has given our country such an admirable and unrivaled distinction for rapid freight transit—in Continental Europe preference is given rather to small-wheeled engines for working the mixed traffic, and thus it is we find there a greater variety of this latter class than is the case at home.

There is, in fact, with Austrian locomotives more approximation to the American types than is usual in most other countries of Central Europe—for instance, moguls are at present the most advanced practice; consolidations are being introduced, and yet others with three-coupled axles and leading bogies are to be constructed. The size of the boilers and cylinders follows closely in the wake of the transatlantic types, as does also the high center of gravity of the boiler, while the general use of extension smokeboxes, replacing chimney spark arresters, adds a dominant feature to the external resemblance. Yet another detail of construction is the shallow fire-box mounted above the frames—but this practice is common also in Belgium and other countries where a large grate surface is necessary and but little depth of fire possible, owing to the fine subdivision of the coal.

In our present impression we select for illustration a new type of goods and mixed traffic engine, the design of which may be taken as representing one of the most perfect forms of locomotive construction suited to the particular conditions of the work to be done. The cylinders are of exceptionally large dimensions, and work compound with Golsdorf's simplified arrangement for dispensing with the usual special starting valves, etc., while every desideratum has been attained for a most economical and—not less important—perfect condition of working under all circumstances, so that the duties of the engineman have been reduced rather than increased by the new accessories, which give him a so much fuller control than before in the handling of his engine, and, it may be added, the extraordinarily commodious cab is also no little comfort to the enginemen..

This engine is carried on four axles, three of which are coupled, while the fourth, a leading axle, works in radial boxes. The rigid wheel base being only 9 ft. 6 in. long, curves of 267 yards radius are traversed with safety and smoothness of movement. Compared with some of the most recent and powerful types of American consolidations, the cylinder capacity is in advance of the boiler power, for although the Austrian locomotive has the very respectable grate area of 29 square feet, yet its shallow fire-box and smaller boiler have only a heating surface of 1,557 square feet, as against the 2,200 of some American engines, with even less power in their cylinders. The steam pressure is 190 lbs.; the tractive effort, at a cut-off of 65 per cent., 9.3 tons.—The Engineer.

Coal Premium on the Prussian State Railroads.

The new coal premium system, which is now being introduced on the Prussian State railroads, seems to have been received with suspicion by a number of the enginemen, but the management hopes that when the men grow more familiar with its principle they will prefer it to the old system heretofore in use.

In the calculations for the new system two exponents, bearing directly on the performance of the locomotive, have been used, viz., time and distance. In contrast with the old system, premiums are not based on the saving in fuel and oil from an allowance, but instead on the ton-mileage made per unit of coal, with due regard to the time consumed.

Besides the monthly premium an additional yearly reward, amounting to 10 per cent. of the total monthly premiums, is allowed, providing that the total consumption during the year does not exceed the estimated minimum for each class of engine by more than 2 per cent. This estimated minimum consumption is arranged on a sliding scale, and is based on the consumption and performance of each engine for the previous year.

The Auditor and the Station Agent.

In the Railway Agent (Cleveland) for July is an article on this subject by Mr. J. Shirley Eaton, in which the writer sketches, in an entertaining manner, the influence of railroad auditors on station agents and their work, during the past ten years. Mr. Eaton evidently has had wide experience in this line of work, and his essay will be found readable by all station agents.

Besides the ticket auditor and the freight auditor there should be, says Mr. Eaton, a "station accountant," to make the settlements with agents, on the figures given by the two auditors, and to do various other things, assisting the department generally. Describing the work on the Southern Railway, Mr. Eaton says:

The station accountant is thoroughly conversant with both the work of the station and that of the office, having had extensive experience in both. He is in close conference with the chief traveling auditor, who has not only charge of the traveling auditors but of the route agents as well, since the claim department is under the jurisdiction of the auditor. The field has been most carefully plotted out. One man was kept on the road for a whole year with the single duty of reporting accurately the volume of clerical work at each agency and the special modifying conditions existing there, together with a careful statement of the way the work was distributed among the station staff and the efficiency of certain methods. This information has been carefully filed for ready reference, and is subject to constant revision. The agents are called upon to lend their fullest co-operation. The Southern Railway Agents' Association, composed of the larger agents, has been organized, with the auditor as presiding officer, which meets quarterly for the discussion of matters of common concern. There is noticeable on the part of the auditor a distinct determination that the agent shall be heard, and that, so far as reasonable, his burden shall be lightened. This is in line with the theory that the auditor's office is both an accounting and auditing office, and may not properly expect agents to do its work, and that agents are a numerous and highly important class in discussing the welfare of the road. The agents constitute a service which in its highest realization will enable every man to feel that when he enters it it is immaterial how remote he may be from headquarters, or how accidental or obscure the location every place is equally under the eye of an appreciative management that is on the alert to put the right man in the right place.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns pesent only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

Some Elementary Notions About Signals.

In our issue of July 29, page 548, we noted some features of railroad signaling on which radically different views prevail. The majority of the railroad officers now in control of signals, especially of those who control signal operations as distinguished from construction and maintenance, are not signal specialists, if indeed they have any technical training at all in this direction; and therefore they are generally anything but anxious to change existing structures or regulations from which tolerably satisfactory results are being secured. A distant signal may be confused with a caution signal for a dozen years and no great harm ensue; any one of two or three different methods of giving permissive signals may be employed and, if the discipline is good, the question of the difference between the several methods, as regards safety, will never be thought of; and, therefore, such officers do not worry much about any alleged need of improvement.

Nevertheless, the signal engineer or any officer in charge who appreciates the evils and annoyances of unnecessary diversity must aim constantly at the highest scientific standards and to lead his less enthusiastic neighbors up to his own level; and, as suggested in the article of July 29, he must have ideals and stick to them. In view of the youth of the signaling art in America and of the great variety of practice (even when we exclude a considerable number of upstart devices and of methods that prevail only on minor roads) it becomes of interest to ask what these ideals should be. Competent signal engineers who have ideals have not said a great deal about them in public, and several ideals that have been exploited have been incomplete, or have been based on the use of special apparatus, or have been formulated for the benefit of a patentee. There is, therefore, room for further discussion of the subject. Without attempting in formulate a complete theory of signaling, we may note two or three desirable ideals.

We can begin (1) with the one mentioned in the former article, that all train movements outside of yards should be made in response to the indications of fixed signals, and to those only. With this, or as a part of this, we must adopt the principle (2) that every signal, when cleared, shall give the right of the track to a certain well defined place. Having gone so far we can (3) say that the indication of a signal at any particular moment shall mean the same to any train that then approaches, without regard to its class or to any rights or restrictions that may belong to it by virtue of the time table or of a telegraphic order. Another ideal which ought not to need stating, is (4) that the same kind of signal shall mean the same thing at any and all places; which includes the rule that the absence of a signal or the failure of a signalman to properly work it shall just as surely command a train to stop in the wilds of Maine or Montana as in a crowded yard.

These few points ought to be readily accepted by anyone who believes in the space interval; and, indeed, they already are, no doubt, but with the proviso that the theories can be carried out only on a large road with unlimited resources. But for the signal maker, or for the railroad officer who has many different kinds of problems to deal with, the question is, to what extent can we conform to these ideals while still we are subject to the restrictions of limited income, old fixtures that it would be wasteful to throw away, and adverse prejudices of officers who control the personnel?

Probably this difficulty is not nearly so great as it seems. Our first ideal demands a fixed signal at every station; and where, on a double track road, it is desired to frequently run trains on the track which is usually used only in the opposite direction it may be necessary to have signals for both tracks in both directions. But an old-fashioned train-order signal or even a flag and a lantern on a post can be used to provide the necessary conformity to the principle. Experience in the use of the space interval on thousands of miles of "thin" railroad during the past ten years has proved this. We must, indeed, have signals both sides of the switches for movements in both directions; but that very simple improvement is much needed already, ideals or no ideals. In England they do not build even the cheapest "light railroad" (where the prospects are so slim that the Government does not require buildings at the way stations), without putting up a home signal at each end of every meeting track, the two to be worked by wire from a central point.

The rule that a signal shall always give a right through a known length of track does not exclude permissive blocking. A permissive signal does not change the length of a block; it merely limits the speed of the train under certain physical conditions. As long as we do not muddle the permissive regulations with attempts to resort to the time interval or with complicated and unworkable prescriptions about flagging, there is no trouble in conforming to sound theory in this matter.

Again, it is to be noted that the very highest ideal does not interfere with either safety or celerity on single track roads. The electric train staff, as used on the Chicago, Milwaukee & St. Paul, and the Chesapeake & Ohio, is vouched for by the officers using it as a perfect blocking apparatus, and it provides also for permissive blocking for following trains while always maintaining the absolute block against opposing trains. Those who think this apparatus too expensive can secure the same conformity to correct principle with the old wooden staff and tablets. In India tablets have for years been handed to the enginemen of rapidly moving trains with no trouble whatever. This idea has lately been put in practice in this country. The train staff can be combined with a semaphore, as on the Chesapeake & Ohio; but any signal engineer who thinks this an unnecessary complication will, no doubt, be willing to modify his first ideal sufficiently to admit that the electric staff apparatus is as simple and as safe as any other means of preserving a space interval between trains.

To give moving orders to trains entirely by outdoor signals necessitates sending all train orders to the agent or operator, and practically means the abolition of the time-table as a document for conferring the right to the road. But this is not such an astonishing innovation; it has been carried out already, in effect, in some places on the larger roads. On the four-track sections of the Pennsylvania a fast train is run around a slower one by semaphore indications alone. The block system, wherever it is used on double track, implies the suspension of time-table rights; why not use it in the same way on single track, and thereby get the full benefit of the money that it costs?

The adoption of the rule that all fixed signals shall give a right for a certain fixed distance will lead to the realization of Mr. Delano's desideratum that interlocking signals shall not be unnecessarily differentiated from block signals. It will also lead to the aboliton of switch signals—distant or otherwise—fixed in the middle of a block, but not connected with the black signals. If poverty absolutely prevents the inclusion of switches in the protection of block signals, it would seem to be desirable, in the interest of consistency, to have anything or everything that indicates the position of the switch made as different from the block signal as possible, so as to emphasize the non-inclusion. A rule that every fixed signal must mean the same to every train might perhaps do away with the use of train-order signals which conflict (or seem to conflict, which in practice may be equally harmful) with interlocking signals near to them. It would also compel the abolition of the practice of putting a signal to danger at ten o'clock for a train not due until eleven, and of employing special written orders for forwarding trains which may arrive before eleven. To accomplish such abolition would, no doubt, be a good thing.

The requirement that a signal at one point must mean the same that a similar signal would mean at any other point will compel the disuse of hand signals such as are now used in some yards, apparently because it is feared that the fixed signals will not be promptly or intelligently obeyed. This rule also logically requires that the common precept to trainmen to "take all other precautions [flagging] that safety may require" shall be just as strictly enforced in large yards as at junctions or crossings out in the woods; which enforcement, if thoroughly carried out, would soon show the flagging rule to be weak and inconsistent, and thereby open the way to an improvement in discipline that is much needed. This fourth ideal would also condemn those home signals (not all of them in Patagonia) which are fixed at some point other than the exact place where the cowcatcher must stop.

As our readers are practical men the foregoing is a long enough list of summer-time lucubrations for one sitting, and we stop. But, being practical men, they will recognize that what is considered an idle and unpractical notion in one place is sometimes found to be a useful theory, put in actual practice, at another; and will, therefore, perhaps find some value in the comparisons that we have suggested.

A Highway Crossing Disaster.

"Whatsoever a man soweth, that shall he also reap." These are words of holy writ, the truth of which has been testified to by many generations of experimenters; and they are called to mind by the statements published concerning the means for giving notice of the approach of trains at a certain highway crossing near Bondville, Mass., where six persons were killed and five badly hurt on the evening of Aug. 27. This party of eleven, in an omnibus or "barge," started out for a pleasure drive, and was struck at the crossing by a passenger train from Northampton, known as the "scoot," with the result just stated. The report in the Springfield Republican says:

> Crossing Flagman David Prouty was seen yesterday. He stated that he carefully flagged every train during the time he was at his post, and he said he usually left the crossing for his home as soon as the 4.28 train from Ware had passed by. He admitted that he had paid the Rich boy to flag the mail train, but he said the train known as the "scoot" was never flagged, unless it happened to pass before the mail train, something which it never did unless the latter was unusually late. Mr. Barker, the Claim Agent, made practically the same statements as made by Mr. Prouty. He also stated that the "scoot" was not flagged. When asked concerning the gong, he said that he had carefully gone over the whole matter with the electrician, and believed the instrument was in good working order up to within a few days. He called attention to a peculiar discovery which had been made. The wire which leads from the signal box to the ground—a distance of about 500 yards on either side from the gong, had been drawn upon the rails so that the passing trains had severed it in several places. Mr. Prouty, whose home is in Belchertown, about 4½ miles from the crossing, was also questioned about the gong, and said: "Gong! why, that thing hasn't been working since last April. I have reported it time and again. Although it has been fixed several times, it is as good as useless. At times it might run well for a day, and then again it would keep up a continuous ringing, so that some time ago I had it entirely stopped." E. W. Phinney, the father of one of the injured, was also asked about the gong, and he stated that during the three years he had lived where he does now, a distance of about 75 yards from the crossing, the gong was often out of repair, and that about a year ago he sent in a complaint to headquarters, signing himself "Citizen."

Drivers on the highway are bound, in morals and reason, and, we hold, in law also, to obey the rule that "in cases of doubt no risk shall be taken"; this rule is as reasonable for a man driving a horse and in charge of a half dozen passengers, as for conductors and enginemen in charge of passenger trains on railroads, all of whom are subject to it. And the driver of the horse, like the driver of the locomotive, is bound to exercise a reasonable degree of discretion, so as to know when a doubt exists. This being so, we rarely, if ever, find a case of this kind in which the evidence does not show the driver of the carriage to be primarily and mainly responsible. In the present case all the survivors but two are children, and all are badly hurt, so we may never know the particulars of the driver's error, though it is to be said that he was a prominent citizen, respectable and sober.

But in spite of all this, the plain moral, from the railroad standpoint, is that which we quoted at the

beginning. To have an attendant at a crossing for some trains and not for others is inviting disaster; and we say this, notwithstanding the fact that such practice is very common. The least that can reasonably be done is to post a very conspicuous notice during the hours that the attendant is absent, stating that no watchman is on duty. And the lesson that unreliable apparatus for automatically ringing a bell is worse than none at all is too patent to need mention. A crossing thus "protected" can very truthfully be held up to a jury as a "death trap," and the company that provides such conditions need be in no doubt about the results which will follow—sooner or later. The scriptural edict applies to corporations as well as to men, and whatever the negligence of the person driving the horse, the public, through courts and juries, has decreed that the crop of damage verdicts to be reaped in cases like this shall be a good sized one. The action of the courts in the late disaster at Valley Stream, N. Y., familiar to our readers, illustrates this.

The Street Car Disaster at Cohoes.

Before the above article is dry we hear of a much worse crossing accident at Cohoes, N. Y. At that place last Monday evening, about 8 o'clock, a southbound express train of the Delaware & Hudson struck a street car at a crossing and killed or badly injured every person on it except one or two; the last accounts giving the number of dead as 16 and the injured as 17. A novelist or a picture-maker for a sensational newspaper, giving free rein to his imagination, could not make a more frightful representation than we find in the plain statement of the facts in this case. The street car was packed full of people returning from a holiday outing, and the locomotive which crushed it was running fast; the street car was struck squarely in its side and was cut completely in two and many of the victims were tossed high in the air.

One account says that the conductor, who was unhurt, and has been arrested on a charge of manslaughter, ran ahead of his car, according to the usual custom, and signaled the motorman to come forward, when the locomotive was plainly to be seen approaching; another says that the street car, approaching on a descending grade, ran upon the crossing uncontrolled because of the failure of the brake.

Everyone must admit that the customary practice here surely invited disaster. The Massachusetts Railroad Commissioners lately found by investigation in that state that trolley cars had been stalled on crossings scores of times; and it can, of course, be only a question of time when such a failure of power will happen just as a train approaches. The same reasoning applies in other states as well as in Massachusetts.

But what can be done? Separation of grades is in many cases almost out of the question; at least it is so for a long time to come. An infallible brake-chain is not the remedy (assuming that the failure of such a chain was the cause of the present disaster), for next time it will be a careless motorman or some other unsuspected delinquency. There is nothing to do but to have interlocked signals and derailing switches. If safety of life and limb is the main consideration, there can be little question that many trolley line crossings are more in need of interlocked signals than numerous steam-road crossings which are already provided with them, the number of passengers carried being many times larger.

Heavy street cars, carrying 30 to 60 or more passengers, have come into use during the past dozen years, and at many crossings such cars have been managed, as far as was possible, exactly like horse-and-wagon traffic. Some improvement has been made as experience has taught the necessity of it, but the difference in conditions introduced by the use of the larger vehicles is still largely unrecognized. A man driving a horse depends, unconsciously perhaps, on making the animal exert a very unusual effort in case of emergency; the trolley car is not susceptible to this treatment. A horse and carriage can generally be driven in any one of several directions; the car can move only in the line of its track. The change, even as compared with the old horse car, is marked. A crowd of 35 persons in a large car is more helpless than a smaller crowd; and even if this were not so the mere increase in the number of persons traveling has increased the danger and the need for precautions.

The only important safety regulation that has been adopted at such places as Cohoes is that requiring the conductor to look (and, presumably, to listen) for steam trains before ordering his car across. But unless there is a clear view for a long distance this leaves a margin of safety that is often ridiculously small. If there is a curve in the railroad, or if a fog prevails, the conductor's ears are the passengers' sole dependence. At best a single minute's delay on the crossing would be risky where trains run very fast, and the only remedy in case of such delay would be to shout to the passengers to get out of the car. Certainly this is not a very scientific method of insuring safety, and yet it is just the means that has had to be used in a considerable number of emergencies on crossings during the past five years. At Cohoes the railroad is said to be straight for half a mile.

As long as there is a possibility of passengers being delayed on a crossing their only safety is a signal which will warn the locomotive runner to look out for them; and as a street car, with a single brake, is more liable to brake failures than a train of four or more vehicles, with a brake on each, so to that extent a derailing switch is more important in the street car track than in the steam railroad.

Annual Reports.

Chicago, Milwaukee & St. Paul.—This company naturally profited by the free movement of grain last year and the growth of general traffic which set in as one result of the good markets obtained for the large crops. The increase in the gross earnings for the fiscal year ending June 30 last was $3,702,896, or 12 per cent. The increase in expenses was $2,624,028, or 14 per cent., leaving the gain in the net earnings as $1,078,862, or 9 per cent. As compared with earlier years, the gross of 1898 is $1,508,000 above the total of 1896, heretofore the year of highest revenue, and $6,855,000 above 1895. The increase between 1898 and 1895 in freight revenue is $6,481,000 passenger receipts gaining less than $150,000. Of the increase in gross earnings last year $3,364,000 was due to freight traffic, and $270,000 to passenger receipts.

It is interesting to observe how marked was the influence of the general improvement in business. Wheat and corn are not the items which show the predominant gains in tonnage. Thus while the increase in the amount of wheat carried was 128,800 tons, an increase of 255,800 tons, or 10 and 75 per cent. respectively, the total tonnage increased 23 per cent., or 2,677,000 tons. The gain in manufactures was 212,000 tons, or 37 per cent.; in iron and steel, 176,000 tons, or 65 per cent.; iron and other ores, 353,000 tons, or over 103 per cent.; lumber tonnage was 335,000 tons over the 1897 figure, or 33⅓ per cent., while other forest products gained 439,000 tons, or 46 per cent.

The general results of operations for the last two fiscal years follow:

	1898.	1897.	Inc.
Gross earnings	$34,189,664	$30,486,768	$3,702 896
Operating expenses	$21,201,567	18,577,539	2,624,028
Net earnings	$12,988,097	$11,909,229	$1,078,868
Other income	131,018	162,823	*31,805
Total income	$13,119,115	$12,072,052	$1,047,063
Fixed charges	7,190,431	7,488,747	*298,316
Balance	$5,928,684	$4,583,305	$1,345,379
Pref. 7 per cent. dividend.	2,104,245	1,896,363	207,882
Surplus for common stock dividend.	$3,824,439	$2,686,942	$1,137,497

* Decrease.

The balance reported above for 1898 equals over 8 per cent. on the common stock, while in 1897 the percentage earned equalled 5.8 per cent. In the 1898 fiscal year 5 per cent. was paid to the common stockholders, and in the 1895 calendar year the company was paying only 2 per cent., while as late as 1890 and 1891 nothing was distributed to the common shareholders.

While the revenue accounts have reached a higher total than ever before, the earnings per mile are below a few other years. The gross receipts per mile were $5,556 in 1898, but were $5,851 in 1893, and $5,643 in 1892. Technically it is not quite exact to say that net earnings are above any previous total. In 1896 they exceeded the figure now reached by $16,900, but the 1898 expenses include a charge of $1,125,000 to renewal account, against only $350,000 in 1896. Not allowing for this net earnings per mile are now $2,111 against $2,114 in 1896, and we have to go back 13 years further to find net per mile as high as these figures.

The distribution of the chief items of expense for the last three years is shown by the following summary:

	1898.	1897.	1896.
Main. way and structures.	$4,642,275	$4,334,955	$4,374,724
Main. rolling stock	2,918,524	2,464,839	2,942,295
Cond. transportation	9,390,3.0	8,475,313	9,102,785
Taxes.	1,134,131	1,184,231	1,082,084
Renewal account	1,125,000	200,000	350,000
Total	$21,201,567	$18,577,539	$19,676,808

The charge against expenses for the renewal fund was heavy. This account is exclusive of car and engine replacement funds, which have been credited with the amount necessary to fill the vacant numbers in the equipment, 194 cars and 21 engines, the latter being under contract. During the year 23 locomotives were built, at a cost of $227,480 and 38 condemned, the cost of replacing them, $355,880, being charged to operating expenses. There were 1,066 cars built to fill vacant numbers, at a cost of $481,278. The cost of air brakes and couplers, etc., $1,197,368, was charged to capital account. Of the total freight car equipment of the company, 81 per cent. has been equipped with automatic couplers and 55 per cent. with air brakes. The total expenditure for rolling stock during the past year—including that for replacement and that for additional equipment, 2,987 cars and 23 locomotives—was $1,709,830. Locomotive repairs cost $1,364,000, or $392,000 more than in the previous year, while car repairs cost $1,474,000, or $43,000 more than last year. These figures include the cost of general repairs to 282 locomotives and 13,782 cars. The increase of $307,000 named above as the increase in maintenance of way is chiefly accounted for by $208,232 additional expenditures for track repairs, and $194,033 for building.

During the year 72 steel bridges, aggregating 5,688 ft. in length, were built, to replace wooden structures; 275 wooden culverts were replaced with iron, and 2.6 miles of pile bridging was filled with earth.

The ton-mile gained 19½ per cent., against the increase of 23 per cent. in tonnage, the average haul falling from 189 miles to 184 miles, or 2.96 per cent. The ton-mile rate also declined .036 cents to .972 cents, but the company secured a better loading of its cars and trains, the average train load being increased from 167 tons to 177.9 tons, and the train-mile earnings were better than last year.

The earnings from passenger travel were $5,986,840—an increase of $269,344 over the previous year, or 4.71 per cent. The number of passengers carried was 7,095,641, a decrease of 59,048, and the number carried one mile was 253,485,504, an increase of 2,374,835 or .95 per cent.; the revenue per passenger per mile was 2.362 cents—an increase of .085 cents, or 3.73 per cent.; the average miles each passenger was carried were 35.72 miles—an increase of .62 miles, or 1.77 per cent. Some of the more important train and traffic statistics follow for the last three years:

	1898.	1897.	1896.
Freight train miles	13,880,445	12,387,036	13,526,151
Passenger train miles	7,930,481	7,819,919	7,788,709
Total rev. train miles	22,951,324	21,199,466	22,285,659
Tonnage.	14,230,742	11,554,153	12,210,055
Ton miles *	2,621,348	2,193,241	2,381,668
Freight car load	10.94	10.74	10.90
Loaded cars per train	16.26	15.56	15.33
Av. train haul (miles)	184.2	189.82	195.06
Av. train load	177.9	167	167.1
Ton mile rate (cts.)	.972	1.008	1.003
Train mile earnings	$1.728	$1.863	$1.676
Loc. repairs (cts. per mile)	5.95	4.59	5.54

* 000 omitted.

The only change in the capital stock has been through the exchange of the convertible bonds into preferred shares. The funded debt is now $136,588,500, or $22,196 per mile, bearing an interest charge of $1,198 per mile There has been a net decrease during the year of $1,173,500 since July 1, 1897, the company having issued $4,317,000 general mortgage bonds and retired $5,490,500 underlying bonds. The company holds in its treasury, as there is due from trustees, $6,587,000 bonds, representing expenditures for improvements, etc., for which bonds have not been sold. The capital charges during the year were $1,796,871, including, besides the $1,197,368 for equipment account previously referred to, $513,553 for second track, $49,477 for third and fourth tracks, and $36,472 for real estate. There have been no additions to mileage, but the second track work completed during the year gives the company a double track from Chicago to Savannah on the Mississippi River, 138 miles.

July Accidents.

Our record of train accidents in July, given in this number, includes 76 collisions, 80 derailments and 4 other accidents, a total of 160 accidents, in which 40 persons were killed and 132 injured. The detailed list, printed on another page, contains accounts only of the more important of these accidents. All which caused no deaths or injuries to persons are omitted, except where the circumstances of the accident as reported make it of special interest.

These accidents are classified as follows:

Collisions.	Rear.	Butting.	Crossing and other.	Total.
Trains breaking in two	8	0	0	8
Misplaced switch	1	1	2	4
Failure to give or observe signal	6	0	2	8
Mistake in giving or understanding orders	0	7	1	8
Miscellaneous	6	1	9	16
Unexplained	12	10	10	32
Total	33	19	24	76

Derailments.			
Loose or spread rail	2	Too quick application of air-brakes	1
Defective bridge	5	Animals on track	2
Defective switch	1	Landslide	1
Broken wheel	5	Sand washed on track	1
Broken axle	10	Street car on crossing	1
Broken truck	4	Unexplained	38
Failure of drawbar	2		
Broken car	1		
Misplaced switch	3		80
Runaway train	3		

Other Accidents.	
Boiler explosion	2
Other causes	2
	4
Total number of accidents	160

A general classification shows:

	Collisions.	Derailments.	Other accid's.	Total.	P. c.
Defects of road	0	8	0	8	5
Defects of equipment	8	22	2	32	20
Negligence in operating	36	7	0	43	26
Unforeseen obstructions.	0	5	2	7	4
Unexplained	32	38	0	70	45
Total	76	80	4	160	100

The number of trains involved is as follows:

	Collisions.	Derailments.	Other accid's.	Total.
Passenger	31	16	3	50
Freight and other	110	64	1	175
Total	141	80	4	225

The casualties may be divided as follows:

Killed:	Collisions.	Derailments.	Other accid's.	Total.
Employees	14	13	3	30
Passengers	1	0	0	1
Others	4	5	0	9
Total	19	18	3	40
Injured:				
Employees	57	35	3	95
Passengers	7	16	9	32
Others	1	0	4	5
Total	65	51	16	132

The casualties to passengers and employees, when divided according to classes of causes, appear as follows:

	Pass. Killed.	Pass. Injured.	Emp. Killed.	Emp. Injured.
Defects of road	0	0	3	9
Defects of equipment	0	0	3	9
Negligence in operating	1	7	15	60
Unforeseen obstructions and maliciousness	0	9	3	1
Unexplained	0	16	6	16
Total	1	32	30	95

Twenty-seven accidents caused the death of one or more persons each, and 36 caused injury but not death, leaving 97 (61 per cent. of the whole) which caused no personal injury deemed worthy of record.

The comparison with July of the previous five years shows:

	1898.	1897.	1896.	1895.	1894.	1893.
Collisions	76	47	35	33	61	89
Derailments	80	97	65	52	75	87
Other accidents	4	2	3	3	12	5
Total accidents	160	146	103	88	148	181
Employees killed	30	16	23	16	43	38
Others killed	10	9	79	9	21	22
Employees injured	95	56	33	48	95	79
Others injured	37	60	154	28	55	97
Passenger trains involved	50	44	33	27	60	55
Average per day:						
Accidents	5.16	4.71	3.32	2.84	4.77	5.84
Killed	1.29	0.81	3.29	0.81	2.06	1.87
Injured	4.26	3.74	6.03	2.45	4.56	5.68
Average per accident:						
Killed	0.25	0.17	0.99	0.28	0.43	0.32
Injured	0.83	0.70	1.82	0.86	1.01	0.97

Only one passenger was killed in a train accident in July, but that was one more than in July, 1897, though 74 less than the number in the same month of 1896, which included the Atlantic City and Logan disasters. We have to add one more to the list of collisions involving troop trains, that at High Springs, Fla., on the 10th. In this case the soldiers were all sick or wounded, but, fortunately, none of them were hurt by the collision. The case illustrates the extreme difficulty of making special passenger trains as safe as regular trains. Surely if unusual precautions will insure immunity from collision, this train ought to have escaped, for it must be that with such a train every conductor, engineman or brakeman, either on it or near it, would keep his wits about him; yet the collision occurred.

Butting collisions, the most disgraceful feature of all disgraceful accident records, make a brave showing in July, the three worst killing 5 and injuring 18. Evidently the view of a prominent Western General Manager, that it is a crime to run trains on a single track railroad without the enforcement of the space-interval, has not yet been accepted throughout the United States. All of these three worst collisions occurred in southern states.

Another accident for which "negligence in operating" is peculiarly responsible is that of the 28th at Kennedyville, Md., where the men charged with the duty (after a flood) of seeing that a bridge was safe, or was made safe, allowed their own train to break it down and fall with it to the bottom of the river.

Accidents to street cars were more numerous than for some months, there being 20 of sufficient consequence to get into the press disptaches. Of these, five were in New York (including Brooklyn) and three in Chicago. At Washington, D. C., the failure of a brake chain resulted in the injury of 30 persons, one of whom afterward died. In a crossing collision in Brooklyn the cars took fire from the broken oil-lamp headlight. At Norristown, Pa., there was a runaway, which appears to have been due to overloading a work-train car with poles. In all of the 20 accidents the number of persons injured was 96 (including the one fatally injured at Washington).

NEW PUBLICATIONS.

The Journal of the Iron and Steel Institute. Edited by Bennett H. Brough, Secretary. London: E. & F. N. Spon; New York: Spon & Chamberlin.

The fifty-third volume of the Journal of the Institute, being Part I. for 1898, is received. It contains the minutes of the proceedings of the meeting of May, 1898, with the reports, papers and discussions. It contains, also, the usual valuable notes on the progress of the iron and steel industries.

Poor's Manual of Railroads. H. V. & H. W. Poor, 44 Broad street, New York City.

The issue of Poor's Manual this year has been delayed beyond the usual date of its appearance. We are informed, however, that it will be ready for subscribers some day next week.

Street Car Fenders.

We noted last week that a fender ordinance was passed by the Chicago City Council to take effect September 1, and that the railroads opposed this for the reason that after considerable investigation nothing in the way of a car fender was found which promised to be satisfactory. Other roads have met with a somewhat similar experience, and especially in Massachusetts has this subject been discussed for years past.

On May 14th, 1895, the act was passed by the General Court in Massachusetts requiring all street railroad companies, operating cars propelled by any motive power other than horses, to provide each car with such fenders and wheel guards as might be required by the Board of Railroad Commissioners. After a careful consideration of the entire subject, the Board, in August of that year, adopted certain regulations for the equipment of street cars with fenders and wheel guards. Briefly, the requirement provided either (1) a fender at the front of the car and with wheel guards underneath, or (2) a fender at front of the car with such a design as to serve also as a wheel guard.

At the same time that these regulations were adopted attention was called to the impracticability of making specific requirements, an illustration at point being found in the case of the city of Brooklyn, which in 1894 passed an ordinance requiring the street railroad companies to equip each electric car, within sixty days, with a safety fender which should extend from the platform to within not more than three inches from the track. A series of actions for the recovery of penalties was brought by the city against one of the companies for non-compliance with the ordinance. It was held by the court, that upon the evidence of the plaintiffs and witnesses and of the experts, that there was at the time of the passage of the ordinance or within 60 days thereafter, no fender made which should do the work required by the ordinance; and that further, owing to the oscillation of the car no device could be made which could run within three inches of the track. The ordinance was therefore held to be unreasonable, and the actions were dismissed with costs.

In view of this experience, the Board of Railroad Commissioners of Massachusetts, while adopting the above regulations, at the same time urged the several street railroad companies to exercise their judgment in the matter of fenders and wheel guards, and on their own legal responsibility, under the statute, select and place on cars such guards as come within the safety requirement of the above mentioned regulations.

The experience of the Market Street Railway in San Francisco is interesting, as reported in a circular by Mr. E. P. Vining, the General Manager, which was issued to the public some months ago. The circular gives the results of numerous trials with fenders and the conclusion reached confirms other reports that it is difficult, if not impossible, to get a suitable fender.

It seems that on May 6, 1895, the Board of Supervisors of San Francisco adopted an order requiring street cars to be equipped in front with fenders or buffers, the design to be approved by the Board. It is stated that during the last three years the street railroad made public tests of 36 different fenders, and up to the time the circular was issued no fender was found which met with the approval of the Supervisors or the citizens who witnessed the tests, so that the order could not be carried out. These fenders included those used in Boston, Providence, Jersey City, Baltimore, Buffalo, Cincinnati and St. Louis, besides seven devised by the railroad and numerous others got up by local inventors.

Mr. Vining discusses some of the features of the fender problem. It is believed that the fender should be attached to the car truck for the following reasons:

"There are many more narrow escapes than dangerous accidents. Thousands of people run across the track in front of a car with barely time to get out of the way. Under present conditions, no person in proper possession of his faculties has been struck. Any device projecting beyond the front of the car platform, and particularly a device placed close to the pavement so as to strike the feet or ankles, would be liable to trip up and injure very many people who would otherwise escape.

"The car body oscillates and rises and falls upon its springs much more than the car truck, and the amount of this oscillation is greatest at the extreme end of the body. Furthermore, each car comes on every trip to some one or more points, where the trucks stand upon a level grade, while the front of the car body projects out over a rising grade. Any device attached to the car body must be raised sufficiently high to clear the pavement under such circumstances, and our experience shows conclusively that, owing to the above-mentioned causes, a device attached to the front of the car body must, under ordinary circumstances, be carried at least 10½ in. above the pavement in order to enable it to clear the pavement at times when it is brought to its lowest point. At this height it is worse than useless, as it would almost invariably pass over a person thrown prostrate in front of it. At the truck, the allowance that must be made for the above-mentioned causes is comparatively slight, and the device can be carried within 3 in. or in some cases within about 2½ in. of the pavement, if placed on the truck.

"When an accident is imminent, the motorman applies his brakes and the speed of the car is rapidly reduced, so that in many cases the car is brought to a stop before the truck reaches the victim of the accident, while in all other cases the speed of the car is much reduced and the liability of serious or fatal consequences is correspondingly diminished."

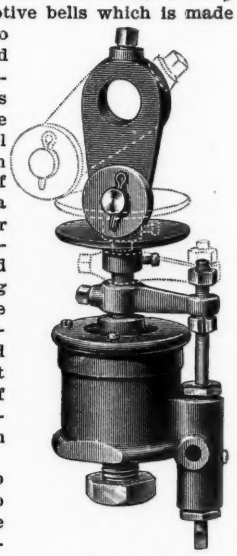
It is considered that, while not perfect, the best arrangement for a fender is a scoop made of spring steel with a rubber edge attached to the pilot board at the front of the truck in such a way that it can be easily dropped to the pavement by the motorman.

As to the nature of street car accidents, it is stated that so far no person has ever been injured in that city upon a crosswalk, and that no person has ever been injured who was in proper possession of his faculties. Such accidents as have occurred have happened to small children and grown people who through infirmity or intoxication were unable to take proper care of themselves.

As a result of the circular the Board of Supervisors has authorized the use of three fenders, one of which was submitted by the street railroad and with it the cars are now being equipped.

The Bartow Pneumatic Bell Ringer.

The engraving shows the Bartow bell ringer, being a device for ringing locomotive bells which is made and sold by the Chicago Pneumatic Tool Co., and which has been in successful use on several railroads for about two years. The motor for ringing the bell has no direct connection with the bell, the crank of the bell shaft having a roller, which works over the disc shown on the motor. The valve is worked from an arm extending from the piston rod to the valve rod, and two adjustable nuts, one above and one below this arm, adjust the length of the stroke of the valve. This also regulates the speed at which the bell is rung.



There are few parts to this bell ringer, and in two years' service there have been no repairs. It is easily placed on the engine by a small bracket on the bell frame. The simplicity of the machine can be easily seen, as also the economy in running it, the stroke being very short, and only 1¾ in. in diameter. It is worked by air from the main reservoir on the engine, and is rung from a valve placed in the cab.

It has been shown that on an engine equipped with a bell ringer, the saving in consumption of fuel has been enough in one month to pay for the device. The explanation of this is that the fireman has so much more time to attend to the firing of the engine, instead of watching for crossings.

TECHNICAL.

Manufacturing and Business.

The American Wood Preserving Co., of Philadelphia, Pa., has just received an order for about 1,100 gallons of woodiline from the New York Central & Hudson River R. R. In November, 1897, a small quantity was used by this company for the treatment of wooden signal boxes. An important Eastern railroad company has had since Jan. 1, 1898, over 7,500 gallons of woodiline, and the Boston Elevated Railroad over 2,000 gallons. The Bangor & Aroostook has recently duplicated an order of two years ago. The Richmond, Fredericksburg & Potomac, the Cumberland Valley, Northern Central and others are regular users of woodiline. The Queen & Crescent placed an order in July, 1896, for 800 gallons of woodiline for use on white oak ties and bridge deck over Cumberland River at Burnside, Ky. This company has just placed another large order for woodiline.

In a recent letter to the Westinghouse Electric & Mfg. Co., Mr. Horace E. Andrews, President of the Cleveland Electric Railway Co., Cleveland, O., says: "We are delighted with the operation of the No. 49 motors, and are having better success with them than with any other motors we have ever operated."

The American Steel & Wire Co. has for some time made a specialty of woven wire fence for railroad use, and its product is now the result of much study and experiment. The company has offices and mills favorably located in different parts of the country, affording unusual facilities for supplying the railroad trade. Its standard railroad fence is made of high-carbon steel wire, with good galvanizing, and efficient, strong and durable, providing for expansion and contraction. The company makes contracts for railroad fencing in any part of the world, not only of woven wire but also for barb or smooth wire, or any combination of these products. It contracts to put up or to furnish any portion of materials. The company is also the sole manufacturer of the following barb wires: Ellwood Glidden, Baker Perfect and Ellwood Junior.

The Atchison, Topeka & Santa Fe and the Michigan Central have recently placed large orders with the National Switch & Signal Co. for iron foundations for cranks, compensators, wheels, etc., similar to the one illustrated in the Railroad Gazette Jan. 7, last.

The Georgia Southern & Florida has placed in its

Macon shops one Hilles & Jones single punching and shearing machine, with capacity for punching 1⅛ in. diameter holes through ⅞ in. plates. The machine has 36 in. depth of throat.

Reade & Bowler of Cleveland, O., have bought and are offering for sale the entire plant of the Akron Steam Forge Co., Ellwood, Ind., consistng of large steam hammers, forge, machinery, tools, buildings, land and gas well.

After nine years of service, T. M. Baker has severed his relations with Randolph & Clowes, and is now connected with the Waterbury Brass Co. of Waterbury, Conn. This company, which was incorporated in 1845, is one of the largest mills in the valley, and makes seamless brass and copper tubes, sheet brass, brass rods, brass wire, etc. Mr. Baker has traveled for a number of years and has a wide acquaintance with the trade.

The Daimler Mfg. Co. of New York City has acquired the real estate and personal property of the Daimler Motor Co., and will continue the business. The following are the officers of the new company: President, Frederick Kuebler; Vice-President, Horace Bacon; Treasurer and Secretary, Otto G. Nestle.

Iron and Steel.

It is reported that the American Steel & Wire Co. has been asked to consolidate with the Federal Steel Co., now being organized.

The stockholders of the Buhl Steel Co. will meet Oct. 27 to take action on a proposed bond issue of $250,000, for the purpose of enlarging and improving the plant.

New Stations and Shops.

Last week we noted the rumor to the effect that the tunnel at Brockville, Ont., was to be closed and a new dock built by the Canadian Pacific. We are officially informed that there is no truth in this report, and that the company is making some repairs on the tunnel.

It is stated that the New York & Ottawa has had plans prepared for new shops to be built in Ottawa, Ont.

The Mexican Central is preparing plans for new shops to be built at Aguascalientes. The building of these shops will extend over two or three years.

The Armour Elevator Co. has taken out a permit to rebuild the elevator at Morgan street and the river, Chicago, which was destroyed by fire last May. The new building will be 362 ft. long, 101 ft. wide and 109 ft. high, and will cost approximately $250,000.

Interlocking.

The Atchison, Topeka & Santa Fe is preparing to put in interlocking plants at Pueblo, Elmira and Denver, Col., the Emporia yards and two at Oklahoma City.

The Boston Terminal Station.

The last roof truss for the main portion of the building is in position. The floor of the large waiting room has been cemented and made ready for the working out of the handsome mosaic designs with which is to be decorated. The line of excavation for the express and mail building runs along a section that was filled in with débris from the great fire of 1872. The steam shovels are encountering much difficulty in getting through this soil, and matters are complicated by the half dozen streams of water which are pouring in from the western embankment. Thirty-six thousand piles have been driven thus far in the construction of the station. When completed, the pile driving will have been the most extensive piece of work of the kind in the country. The train-shed tracks are in place, with one exception.

The New Battleships.

As a result of the bids for three battleships, it is almost certain that we shall have three 18-knot ships of well over 12,000 tons displacement, and that they will be built in something less than three years and that one will be built by the Newport News Shipbuilding & Dry Dock Company, one by William Cramp & Sons, and one by the Union Iron Works of San Francisco. The Newport News Company bid $2,850,000 for one ship of 18 knots speed and 12,500 tons displacement. William Cramp & Sons bid $2,885,000 for one ship of 18 knots and 12,150 tons displacement. The Union Works bid $2,899,000 for an 18-knot ship of 12,200 tons displacement. The adoption of the 18-knot requirement will probably result in the use of water tube boilers.

The Boston Subway.

The city officials of Boston, with the Massachusetts Railroad and Police Commissioners and delegates from the Legislature, were conducted on a trip of inspection through the newly completed portion of the Boston Subway on Tuesday, Aug 30.

On Saturday, Sept. 3, the whole subway was thrown open for public travel. The Boston Elevated Railway, operating the surface street cars of the city, at once adopted new regulations for giving free transfers, greatly enlarging the facilities for riding long distances for a single fare. Passengers from Huntington avenue may transfer free at Park street subway station to cars going to Charlestown, Medford, Everett and other towns in the east and north. A considerable number of cars still run on the surface tracks through Tremont street.

The subway was begun in March, 1895, and is about 1.7 miles long. It contains about five miles of track. The total cost is said to be $5,786,000, and the work has been completed in 10 months less than the time limited by law. A description of the plans was published in the Railroad Gazette of May 31, 1895, page 341; of the tunnel shield and its use, Feb. 12, 1897, page 108, and of the coverings at the entrances Nov. 26, 1897, page 833.

A New Dry Dock at Newport News.

Work has been started on a new dry dock to be built at the yard of the Newport News Ship Building & Dry Dock Co., Newport News, Va. The dimensions are 800 ft. long, 90 ft. wide on the bottom, with 30 ft. of water over the sill. The entrance will be of granite and the body of the dock of timber. The dock, when finished, will be capable of docking any two battleships afloat, or the largest merchant ship either built or building.

Track Jack Litigation.

The Circuit Court of the United States, Western District of Michigan, Judge Severens, has granted a preliminary injunction restraining the Kalamazoo Railroad Velocipede & Car Co. from manufacturing and selling the Barrett patent jacks, as made by the Duff Mfg. Co., Allegheny, Pa.

A Bad Bridge Accident.

Pier No. 2 and two spans of the Ottawa & New York Railway Company's bridge over the south channel of the St. Lawrence River, from Cornwall Island to the American shore, fell about noon Sept. 6, carrying down a number of workmen, many of whom were killed or drowned. At last accounts the number killed and drowned is placed at 14, and 17 seriously injured men are in hospital. The bridge was so near done that it was said that in case of need a train could have been run across it in twenty-four hours more. The spans which fell are each about 370 ft. long and the bottom chord is 37 ft. 5 in. above water. From the newspaper reports, we can only gather the fact that two spans and one pier were wrecked. Obviously, it would be premature to say a word as to the nature and cause of the accident, which certainly is a most unfortunate one.

THE SCRAP HEAP.

Notes.

On Aug. 31, over $100,000 worth of flour in the New York Central freight house at River street, Buffalo, was ruined by fire.

The Cleveland, Cincinnati, Chicago & St. Louis has established the block system between Cincinnati and Indianapolis, 111 miles. The block system is already in effect on this company's line between Cleveland and Cincinnati, 263 miles.

The Chicago Great Western is building at its shops a car and apparatus for sprinkling the roadbed with oil. Having the aid of a Chicago reporter, this road will be able to make this improvement more successfully than has been possible anywhere else; will, in fact, "make it suicidal for a weed to attempt to get within 10 feet of the track."

President W. H. Baldwin of the Long Island Railroad informs the Board of Health of New York City that 25 passenger engines of the company now burn hard coal, and that 31 per cent. of the entire amount of coal used by the company in locomotives is anthracite. The hard coal costs the company $3.50 a ton, just twice as much as bituminous, making the additional cost over $300,000 a year.

In Savannah, Ga., on Aug. 30 and 31, property was damaged over $500,000 by a severe rain and wind storm, over 100 buildings being unroofed. Telegraphic communication with the city was interrupted for a whole day, and railroad communication was seriously interrupted for more than 48 hours. A press dispatch of Sept. 2 stated that many miles of roadbed and several bridges would have to be repaired before trains could reach the city from the North and East.

A press dispatch from Montreal states that E. E. Clark, Chief of the Order of Railway Conductors, and B. B. Osler, a lawyer of Toronto, have been chosen arbitrators to settle a difference between the Grand Trunk Railway and its locomotive firemen, concerning the discharge of three firemen who were agitators. The company claims that the strife stirred up by the discharged men justified their dismissal and that, since they have been got rid of, matters have been running more smoothly.

The Internal Revenue Law.

The Attorney-General of the United States has rendered an opinion holding that under the War Revenue act the express companies must furnish without extra charge a stamped receipt for all packages transported for the Government, and they are not exempted from furnishing the stamp by the plea that it would impair a contract for carrying such packages at a fixed price.

Attorney-General Griggs has written to the Secretary of the Illinois Manufacturers' Association stating that as between express companies and individual shippers, the Government has no concern unless the stamp act is violated. The express company is required to issue a receipt and the receipt must have upon it a canceled stamp; failure to issue a receipt incurs a penalty of $50.

According to a press dispatch from Chicago, the Adams, the American and the United States Express companies will hereafter pay the stamp tax of one cent on each bill of lading instead of refusing to accept goods unless the shipper pays it.

A press dispatch from Washington says that a number of railroads, and among them some of the large corporations, are daily violating the internal revenue law by issuing receipts for excess baggage without duly stamping the same, as required to do under the War Revenue act. The Internal Revenue Bureau has advised collectors in certain sections where the practice is in vogue, and has directed them where possible to make an estimate of the number of receipts that have illegally issued.

A modification has been made of a former ruling permitting the acceptance of certain classes of unstamped messages by telegraph companies, so as to include messages from an officer or agent of any railroad company addressed to another officer or agent of a railroad company at any point on or off the lines of the road when such messages are in regard to the affairs and services of the railroad company. Also messages from an officer or agent of any railroad company addressed to an officer or agent of a connecting railroad company, when such messages are in regard to the joint business of the two railroad companies.

National Irrigation Congress.

The National Irrigation Congress met at Cheyenne, Wyo., September 1 and 2. Resolutions were passed favoring an appropriation of not less than $100,000 for hydrographic surveys, for the measurement of streams and the survey of reservoir sites; commending the care of forests begun by the Secretary of the Interior, and urging the formation of a Forestry Bureau and an appropriation by Congress sufficient for its support and management. The resolutions urge upon the states legislation to prevent forest fires; favor the suggestion of Professor Sargent, of Harvard University, that instruction in forestry be given at West Point, to prepare army officers for an intelligent understanding of forestry administration; commend the action of Cornell University in starting a school of forestry; favor the creation in the Department of Agriculture of a bureau of irrigation and a liberal appropriation for its support; express cordial appreciation of the value of irrigation investigations already made by agricultural experiment stations, and recommend that they give increased attention to the arid states; request Congress to make sufficient appropriations to construct the reservoir surveyed at Butte, Ariz., and to construct a watershed reserve near Butte, Mont.; provide that a committee of five be appointed to present a bill to Congress establishing uniform methods for appropriation, and control of the waters of interstate streams; reaffirm the resolutions of the Phoenix Congress on reservoirs, of the Lincoln congress on the public ownership of water, and of the Phoenix congress on the cession of public lands to the states under strict conditions insuring settlement, and indorse the Chittenden report favoring the construction of reservoirs and the recommendation of Elwood Mead favoring the leasing of the grazing lands.

Cartage in London.

At the request of a resident of New Jersey, an instruction was sent to the Consul-General at London, June 22, 1898, asking that information in regard to central control over public cartage in that city be supplied the Department. Mr. Osborne sends the following in reply, under date of July 21, 1898:

After investigation, I find that there is no central control of public cartage. Many years ago there was such control over carts and carmen; but since the introduction of railroads the latter do most of the public cartage in London. There are two or three large companies, such as Pickford & Co., and Carter, Paterson & Co., who independently carry on considerable business, and who have a large number of vans of every description scattered over the city.

There is another class of carmen, styled "bonded carmen," who hold a license from the board of customs. The right of ordering and disposing of these carts, cars and carmen, and all persons working the same within the city, rests with the corporation. The carts are subject to an annual license, and the number licensed last year was 136. These and other carts and wagons are widely used throughout the city by warehousemen and others, for the conveyance of goods and other merchandise.

In the city of London, under the authority of various acts of Parliament, the Commissioner of the City Police has controlling powers for regulating the traffic, and the same applies to cabs and omnibuses, which are all licensed at Scotland Yard by the Commissioner of Metropolitan Police. In the judgment of the corporation officials, existing arrangements are satisfactory; and the latter have been greatly assisted by recent post office legislation, which has afforded increased facilities for the distribution of small parcels.

The American Line Passenger Steamers.

The four vessels of the American line—the New York, the Paris, the St. Louis and the St. Paul—which have been used by the Government during the war, have been sent to Cramp's shipyard, Philadelphia, to be restored to the exact condition in which they were before the war, preparatory to being returned to the American line.

To Develop Cuba and Porto Rico.

Articles of incorporation of the American Indies Company, with $18,000,000 capital, were filed Sept. 6 with the Secretary of State of New Jersey. The incorporators are Thomas Dolan, P. A. B. Widener and W. L. Elkins of Philadelphia; Thomas F. Ryan, Frederick P. Olcott, Anthony N. Brady, R. A. C. Smith, Henry D. Macdona, J. M. Ceballos, Guillermo de Zaldo, H. P. Booth and H. G. Runkle. The company is formed for the purpose of operating public franchises, such as power, gas, electric lighting, water works and street railroad plants. Henry D. Macdona is Secretary.

British Steel Tubes for the United States.

The U. S. Consul at Birmingham writes: "A couple of days ago I received from a firm of merchants in the United States a request for the names of British manufacturers who make seamless steel tubes of 8 and 12-in. bore, walls of ¼-in. thickness, with 4-in. flange, and the inside of gun-barrel smoothness.

"In response to letters sent to manufacturers, I have had calls from their representatives and have given them the address of the American firm making the request. From some of these people I learn that they have received inquiries direct from other American firms for tubes of 4, 6 and 8-in. bore. They are surprised that there should be an intention to have the tubes and flange in one piece of metal, as Government requirements here and on the Continent demand that the flange be attached separately by rivets. The manufacturers of bicycle and other small seamless tubes here are in a mild state of excitement, owing to advices they have received from the United States that there is a prospect of the formation of a

trade trust with a general increase of price, and they anticipate that this may admit English tubes again to the American market."

The Sharon Collision.

On Sunday, Aug. 21, about 7.15 p. m., there was a disastrous rear collision of eastbound passenger trains on the New York, New Haven & Hartford at Sharon, Mass., and five or more passengers were killed. Over 30 were injured. The foremost train was standing at the station. Its rear car was completely wrecked and the engine penetrated about five feet into the next car in advance. Sharon is on the Providence Division, 18 miles south of Boston, and only three miles from Canton Junction, where a fast mail train was wrecked on Aug. 8, and three men were killed. In the Sharon collision it appears that the second train consisted of cars which usually are attached to the foremost train at Mansfield, but in this case were run as a separate section, travel being heavy; but the foremost train had to make local stops and, moreover, lost some time; while the second one had no stops to make, and thus rapidly gained on the leading train.

The State Railroad Commissioners began an investigation on Aug. 31. From the report of the evidence, published in the Boston Herald, it appears that the automatic block signals and the air brake apparatus on both the engine and the cars were in perfect condition and that the collision must have been due to the failure of the engineman to control his speed. The road is equipped with electric automatic clock-work disk block signals. The standing train was in a block extending back about 5,000 ft., the approach being on an easy curve and the tail end of the train being visible about 2,900 ft. The rear trainman on the foremost train says that he threw off a fusee near Sharon Heights about 1.3 miles back, but the engineman claims that he saw no such signal. There is a disk signal about 1,500 ft. in the rear of Sharon station, which is not connected with the block signals, being controlled only by the switches of a cross over track. This signal presumably showed all-clear, but it does not appear that its presence had anything to do with the failure of the engineman to control his speed. The collision took place in about 30 seconds after the first train arrived at Sharon. The engineman, D. W. Getchell, says that he applied the brakes at Sharon Heights but found that they did not slacken the speed of the train. It is not very clear what action he then took; but, soon after, he made a second application of the brakes and then they seemed to work all right, but he struck the other train at a speed estimated by him at ten miles an hour, and by other competent observers at 20 miles an hour. Whatever the rate of speed, it was high enough to split completely open the first passenger car struck by the engine, and wreck the end of the next car beyond. It is said that the second train was to have made a regular stop at Sharon station.

Getchell is a freight runner and his usual duty is running a switching engine at Mansfield. He is 38 years old, has been in the railroad service 17 years and an engineman 5½ years. In his last examination on the management of the air brake, he was marked seven on a scale of ten.

Henry S. Kolseth of the Westinghouse Air Brake Co. had examined the cars and engines and believed that "the engineman had frittered away his air pressure." Frank S. Coggin, air brake instructor for the road, believed that "the only reason the brakes did not stop the train in time to avoid the collision was delay in setting them."

LOCOMOTIVE BUILDING.

The Schenectady Locomotive Works are building another engine for the St. Joseph Stock Yards.

The Baldwin Locomotive Works are building one more engine for the St. Louis, Peoria & Northern.

The Kansas City Suburban Belt has ordered two switching locomotives from the Baldwin Locomotive Works.

In our last issue we stated that the Central Railroad of New Jersey had placed an order with the Baldwin Locomotive Works for four engines. This should have read Central Railroad of Brazil.

The Kansas City, Pittsburgh & Gulf has placed an order with the Baldwin Locomotive Works for 15 10-wheel simple locomotives for December delivery. Weight of drivers, 115,000 lbs.; total weight, 150,000 lbs.; cylinders, 20 by 26; diameter of drivers, 54 in.; extended wagon top boilers, working steam pressure, 180 lbs.; fire box, 108 in. long; tank capacity, 4,500 gals.; coal capacity, 8 tons. Westinghouse air brakes, iron axle, Leeds reversible couplers on pilots, U. S. headlights of Wabash pattern, Ohio injectors, Sullivan piston and valve rod packings, Ashton safety valves, Mertsheimer sanding devices, Nathan lubricators, Baldwin springs and Standard tires will be used.

CAR BUILDING.

The Continental Fruit Express has ordered 250 refrigerator cars from Wells & French.

The Intercolonial Railway of Canada has asked tenders for 300 box and 100 flat cars.

The Kansas City, Pittsburgh & Gulf is about to order several hundred flat and coal cars.

The Canadian Pacific has given an order to the Montreal shops to build two new dining-cars.

The Delaware & Hudson has ordered 100 additional hopper coal cars from the Buffalo Car Mfg. Co.

The Ohio Falls Car Mfg. Co. denies having received an order from the Georgia Railroad for 200 cars, as reported by a contemporary.

The Chicago, Burlington & Quincy has ordered 600 coal cars of 80,000 lbs. capacity, 300 of which will be built by Wells & French, and the balance by the Michigan Peninsular Car Co.

BRIDGE BUILDING.

ANDOVER, N. B.—A new iron bridge will be built here, it is reported.

BURLINGTON, IA.—The Board of Supervisors of Des Moines County will be required to spend about $10,000 for repairing and building bridges recently damaged by floods.

CHARLEMONT, MASS.—The town will build an iron bridge over Mill Brook, to have a span of 40 ft.

COUNCIL BLUFFS, IA.—The city will build three steel bridges, one over the tracks of the Omaha Bridge & Terminal Ry., to have a span of 80 ft.; one over the tracks of the Wabash, 80 ft. span, and a highway bridge at Bryant street, to have a span of 60 ft.

GLADSTONE, MICH.—The Gladstone & Northern will build a bridge 700 feet long. (See Railroad Construction column.)

IRWIN, PA.—The Westmoreland Junction Railroad will build a bridge. (See Railroad Construction column.)

LEBANON, TENN.—A bridge will be built at Main street by the town of Lebanon.

LOUISVILLE, KY.—The Pennsylvania Co. will build a new steel draw in the bridge over the canal at Fourteenth street. The steel work will be made by the Louisville Bridge & Iron Co., and erected by the Pennsylvania Company's engineers. A temporary steel draw is now being built.

MACON, GA.—The bridge over the Ocmulgee River at East Macon has been condemned and closed, and a new bridge must be built.

MINOT, N. DAK.—The Great Northern will build a steel bridge at Minot to replace a wooden one recently destroyed by flood.

OAKLAND, CAL.—The War Department has approved the plans for the new Webster street bridge over the San Antonio Estuary and the Board of Supervisors will shortly advertise for bids.

OMAHA, NEB.—An ordinance has been introduced in the City Council, declaring the necessity for a new bridge over the railroad tracks on South Sixteenth street, and instructing the City Engineer to prepare plans and specifications.

PAKENHAM, ONT.—Alex. Murphy, C. E., Antrim, Ont., has prepared plans for an inter-county bridge to be built over the Waba River, near this place.

PORTLAND, ORE.—The Oregon RR. & Navigation Co. will replace two wooden bridges over the Umatilla River and one over Meacham Creek, during September, with steel bridges. In October two more will be built, one over the North Powder River and the other over the Palouse. Robert Wakefield of Portland will build the foundations. These bridges are made by the Carnegie Steel Company of Pittsburgh, Pa. Each bridge will have a single span of 150 ft., and the total cost of the five structures is $50,000. Later on a number of wooden bridges will be replaced with steel trestles.

SANTA BARBARA, CAL.—It is stated that City Engineer Flournoy is preparing plans for a bridge over Mission Creek on West Ortega street.

MEETINGS AND ANNOUNCEMENTS.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

American Academy of Railway Surgeons.—Meets at Chicago, Oct. 5, 6 and 7.
American Association of General Passenger and Ticket Agents.—Meets at Detroit, Mich., Oct. 18.
American Association of Traveling Passenger Agents.—Meets at Lakewood, N. Y., on Chautauqua Lake, Sept. 12.
American Railway Association.—Meets at the Holland House, New York City, at 11 a. m. on Oct. 12.
American Society of Civil Engineers.—Meets at the house of the Society, 220 West Fifty-seventh street, New York, on the first and third Wednesdays in each month at 8 p. m.
Association of Engineers of Virginia.—Holds its formal meetings on the third Wednesday of each month from September to May, inclusive, at 710 Terry Building, Roanoke, at 5 p. m.
Association of Railway Superintendents of Bridges and Buildings.—Eighth annual convention, Murphy's Hotel, Richmond, Va., from Oct. 18 to 20.
Boston Society of Civil Engineers.—Meets at 715 Tremont Temple, Boston, on the third Wednesday in each month at 7.30 p. m.
Canadian Society of Civil Engineers.—Meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday at 8 p. m.
Central Railway Club.—Meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.
Chicago Electrical Association.—Meets at Room 1737, Monadnock Building, Chicago, on the first and third Fridays of each month at 8 p. m. J. R. Cravath, secretary.
Civil Engineers' Club of Cleveland.—Meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.
Civil Engineers' Society of St. Paul.—Meets on the first Monday of each month except June, July, August and September.
Denver Society of Civil Engineers.—Meets at 3 Jacobson Block, Denver, Col., on the second Tuesday of each month except during July and August.
Engineers' Club of Cincinnati.—Meets at the rooms of the Literary Club, 25 East Eighth street, on the third Thursday of each month, excepting July and August, at 7.30 p. m.
Engineers' Club of Columbus (O.).—Meets at 12½ North High street on the first and third Saturdays from September to June.
Engineers' Club of Minneapolis.—Meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.
Engineers' Club of Philadelphia.—Meets at the house of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month at 8 p. m., except during July and August.
Engineers' Club of St. Louis.—Meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.
Engineers' Society of Western New York.—Holds regular meetings on the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.
Engineers' Society of Western Pennsylvania.—Meets at 410 Penn avenue, Pittsburg, Pa., on the third Tuesday in each month at 7.30 p. m.
Freight Claim Association.—Meets at Mobile, Ala., Oct. 5.
International Association of Ticket Agents.—Meets at Cleveland, O., Sept. 13.
Locomotive Foremen's Club.—Meets every second Tuesday in the clubroom of the Correspondence School of Locomotive Engineers and Firemen, 335 Dearborn street, Chicago.
Master Car and Locomotive Painters' Association.—Annual convention, Ryan Hotel, St. Paul, Minn., Sept. 13 to 16, both inclusive.
Montana Society of Civil Engineers.—Meets at Helena, Mont., on the third Saturday in each month at 7.30 p. m.
New England Railroad Club.—Meets at Pierce Hall, Copley Square, Boston, Mass., on the second Tuesday of each month.
New York Railroad Club.—Meets at 12 West Thirty-first street, New York City, on the third Thursday in each month at 8 p. m., excepting June, July and August.
Northwest Railway Club.—Meets on the first Tuesday after the second Monday in each month at 8 p. m., the place of meeting alternating between the West Hotel, Minneapolis, and the Ryan Hotel, St. Paul.
Northwestern Track and Bridge Association.—Meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.
Roadmasters' Association of America.—Annual convention will be held at the St. James Hotel, Denver, Sept. 13, 14 and 15.
St. Louis Railway Club.—Holds its regular meeting on the second Friday of each month at 3 p. m.
Southern and Southwestern Railway Club.—Meets at the Kimball House, Atlanta, Ga., on the second Thursday in January, April, August and November.
Technical Society of the Pacific Coast.—Meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.
Western Foundrymen's Association.—Meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. A. Sorge, Jr., 1533 Marquette Building, Chicago, is secretary.
Western Railway Club.—Meets in Chicago on the Third Tuesday of each month at 2 p. m.
Western Society of Engineers.—Meets in its rooms on the first Wednesday of each month at 8 p. m., to hear reports and for the reading and discussion of papers. The headquarters at the Society are at 1736-1739 Monadnock Block, Chicago.

The Northwest Railway Club.

The Northwest Railway Club will hold a regular meeting at the Ryan Hotel, St. Paul, on Tuesday evening, Sept. 13.

Texas Railway Club.

On account of the burning of the Beach Hotel, Galveston, Tex., the next meeting of the Texas Railway Club will be held at the Del Mar Hotel, Rockport, Tex., instead of at Galveston. This meeting will be on Sept. 19 and 20, and the Secretary of the Club states that there will be ample accommodations for all members and visitors who may attend.

The American Society of Civil Engineers.

A regular meeting of the Society was held Wednesday night, Aug. 31, being the first meeting of the season. The subject discussed was "The Relation of Tensile Strength to Composition in Structural Steel," being a discussion of a paper by Mr. Cunningham. The discussion was opened by Mr. Webster and communcations were received from Mr. Metcalf and Mr. Cunningham.

Railway Signaling Club.

The next meeting of the Railway Signaling Club will be held Tuesday afternoon, Sept. 13, at the Great Northern Hotel, Chicago. The special committee appointed at the May meeting will report the result of a letter ballot as to whether the Club should undertake to recommend a set of standards for the common details of signals and interlocking. The following topics also will be discussed: "Distant Signals;" "Should One or Two Wires Be Used with Wire Connected Signals?"; "Recent Improvements in Signals;" "The Use of Bracket Signals."

International Conference of the Railroad Y. M. C. A.

The ninth international conference of the Railroad Young Men's Christian Association will be held in Ft. Wayne, Ind., October 20 to 23, 1898. The Ft. Wayne Railroad Association will entertain the conference and offers free entertainment to five representatives from each railroad association and to railroad men from unorganized fields; the application for accommodation to be addressed to Mr. J. W. Burns, Railroad Secretary, Ft. Wayne, Ind. Both the Pullman and Wagner Companies have authorized the rate of one fare for the round trip for their cars, and all the leading railroad companies have agreed to grant free transportation to employes of any roads on request of the International Committee. It is expected that at least five hundred railroad men will attend this conference. Further information may be obtained from Mr. C. J. Hicks, Railroad Secretary, 3 West Twenty-ninth street, New York.

St. Louis Railway Club.

A regular meeting of the St. Louis Railway Club was held at the St. Louis Stock Yards, St. Clair County, Ill., Friday, September 9. A special train was provided, which left the Union Station at 2.30 p. m., and the meeting was held in the National Stock Exchange at 3 o'clock. Mr. Philip E. Hale, editor of the National Stock Reporter, read a paper entitled "Live Stock Traffic and Rates, and Their Influence on St. Louis as a Live Stock Market." The stock yards and principal packing houses were also visited, one of the most interesting places being the new plant of the Nelson Morris Co., where stock are killed by electricity.

The August Proceedings of the St. Louis Railway Club contain an abstract of Prof. J. B. Johnson's presidential address before the Boston meeting of the Society for the Promotion of Engineering Education, an abstract of a paper by Mr. C. E. Carson, entitled "Service Cards," read before the Central Association of Railroad Officers, and a paper on the "Evolution of the Locomotive," by Mr. Maurice Demoulin, printed in the Bulletin of the International Railway Congress. These articles were published in the Railroad Gazette of Aug. 12 and 19 last.

Western Society of Engineers.

The following is the programme of the papers which will be presented before the Western Society of Engineers between September, 1898, and February, 1899:

Sept. 7—The "Equilibrist" (for railroad track inspection), D. J. Whittemore, Chief Engineer C. M. & St. P.; Mechanics of Suction and Suction Pipes, Daniel W. Mead, Consulting and Constructing Engineer, Rockford, Ill.; Cableway Construction, Robert D. Seymour, Trenton Iron Co., Chicago; Concrete Facing on a Sandstone Bluff at St. Paul, Onward Bates, Engineer and Superintendent of Bridges, C., M. & St. P.

Sept. 21 (Ladies' Evening)—The Soudan and Recent British Campaigns There, H. G. Prout, Editor Railroad Gazette, New York.

Sept. 28—The Foundations for the United States Government Post Office and Custom House Building at Chicago, William Sooy Smith, Civil Engineer and Contractor, Chicago.

Oct. 5—Track Elevation of the Chicago & Northwestern Ry., Louis H. Evans, Engineer of Track Elevation, Chicago. In discussion of this paper notes will be presented on the track elevation of—Illinois Central Ry., H. W. Parkhurst, Engineer of Bridges and Buildings, Chicago; C., M. & St. P. Ry., Wade Rogers and A. Reichmann, Asst. Engineers, Chicago; C., B. & Q. R. R., G. H .Bremmer, Asst. Engineer, Chicago; L. S. & M. S. Ry. and C., R. I. & P. Ry., L. H. Clarke, Engineer of Track Elevation, Chicago; P., F. W. & C. Ry., W. H. Coverdale, Engineer of Track Elevation, Chicago; P., C., C. & St. L. Ry., Thos. H. Johnson, Chief Engineer, Pittsburgh, Pa.; Sixteenth Street Crossing, G. W. Vaughn, Engineer in Charge, Chicago. (Title to be announced later.) Prof. Robert B. Owens, University of Nebraska, Lincoln, Neb.

Oct. 19 (Ladies' Evening)—Masonry (illustrated), George S. Morison, Civil Engineer, New York.

Nov. 2.—Construction of Retaining Walls for the Sanitary District of Chicago, James W. Beardsley, Sub-Asst. Engineer, Sanitary District, Chicago; Berthier Method of Coal Calorimetry, Prof. Charles V. Kerr, Armour Institute, Chicago; Brakes for Electric Cars, William G. Price, Engineer, Chicago City Ry.

Nov. 16—The Manchester Ship Canal (illustrated), Elmer L. Corthell, Consulting Engineer, New York; Tables of Excessive Precipitations of Rain at Chicago, Edwin Duryea, Jr., Resident Engineer, East River Bridge, Brooklyn.

Dec. 7.—Electrolytic Corrosion of Underground Metallic Structures, Prof. D. C. Jackson, University of Wisconsin, Madison, Wis.; Mechanical Plants of Large Buildings (Part II.), Dankmar Adler, Architect, Chicago.

Dec. 21—Foundations for Railroad Bridge Across the St. Lawrence River at Cornwall, Ont., George E. Thomas, Superintendent Sooy Smith & Co., Chicago; Drawbridges on Chicago & Northwestern Ry., William H. Finley, Engineer of Bridges, C. & N. W.; Notes on Engineering Work, John S. Prell, Consulting Engineer, San Francisco, Cal.

Jan. 3—Annual Meeting.

Jan. 18—Establishment of Street Grades, Charles P. Chase, Iowa Engineering Co., Clinton, Ia.

Feb. 8.—Measurement of the Discharge of the Niagara River, Clinton B. Stewart, Engineer with Deep Waterways Commission, Detroit, Mich.; The Effect of Speed and Radii of Curves on the Inclination of Bicycle Tracks, John C. Quade, City Engineer, Keewanee, Ill.

PERSONAL

—Mr. John Adams, who was President and builder of the Buffalo Creek Railroad, and at one time President of the Western New York & Pennsylvania, died in Buffalo, N. Y., Aug. 31, at the age of 75.

—We lately mentioned the fact that Mr. E. M. Herr, Superintendent of Motive Power of the Northern Pacific, is to go to the Westinghouse Air Brake Company. We learn now definitely that his title is Assistant General Manager, and that his duties will comprehend a general supervision of the entire business.

—Mr. Ashbel Green, who was recently appointed General Counsel of the Vanderbilt lines, died at Tenafly, N. J., Sept. 4. He became General Counsel of the West Shore about 12 years ago, and held that position until July of this year, when the law departments of the New York Central & Hudson River and West Shore were consolidated. He was then appointed General Counsel of Vanderbilt lines east of Buffalo, succeeding Mr. Frank Loomis, who became Special Counsel. He was 71 years of age.

—Mr. Tilghman B. Koons, who was lately appointed General Freight Agent of the Central of New Jersey, entered railroad service in 1872 as a telegraph operator with the Delaware, Lackawanna & Western. After a year's service in that capacity he entered the General Freight office of the Lehigh Valley as a clerk, in which position he remained nine years. In 1881 he became General Agent of the Central of N. J., with headquarters at Elmira, N. Y. From 1887 up to the present time he was Division Freight and Passenger Agent, with headquarters at Mauch Chunk, Pa.

—Mr. John Greenough, of the firm of Poor & Greenough, retired from that firm and from active business on Sept. 1. Mr. Greenough, besides his relations with this firm of bankers and brokers, is one of the owners of "Poor's Manual." He has been known for many years as a man actively and widely interested in railroads, having been connected in various official capacities with the Wheeling & Lake Erie, the "Monon," the Missouri, Kansas & Texas, New York, Ontario & Western and other roads. He has also large industrial holdings in coal mines, ranches and various other interests. His activity, his ability and above all, his high standards have made him for years an important figure in Wall street life.

—Mr. James S. T. Stranahan of Brooklyn, N. Y., died in Saratoga last Saturday. Mr. Stranahan was born in Peterboro, N. Y., April 25, 1808. Early in his life he became interested in transportation matters and in railroad contracts, and his active and enterprising career has been closely identified with the progress of the nation. He was, perhaps, the originator of the Atlantic Dock Co. in Brooklyn, was one of the founders of and a director in the Union Ferry Co., and from 1875 to 1885 was a trustee of the Brooklyn Bridge, during the period of its construction. He was very active in pushing ahead the New York & Erie Railroad from Binghamton to Dunkirk at a time when many friends of that enterprise despaired of ever seeing it carried out.

—Mr. Wilson Eddy, for about 40 years connected with the Western Railroad of Massachusetts and its successor, the Boston & Albany, and for 30 years Master Mechanic, died at his home in Springfield, Mass., on Sept. 2, at the age of 86. He retired from active service in 1880. His death was due to heart disease and he was sick only a few hours. Mr. Eddy was born in Chelsea, Vt., in 1813, and at the age of 19 went to work in the machine shop of the Locks & Canal Co. at Lowell, Mass. Here he became acquainted with Major Whistler, and was by him called to the Western road in 1840. Being on a pioneer railroad, he became acquainted with locomotive building in its earliest stages, and he was himself a designer of skill and originality. His first engine was the "Addison Gilmore," named after the President of the road. It had a single pair of driving wheels, 81 inches in diameter, and outside cylinders placed in a horizontal plane with the driving axles. The engine had a pair of small trailing wheels and no cab. This locomotive was completed in April, 1851, and on October 2 of that year it took a gold medal in a contest at Worcester for running 9 miles in 11 minutes 29 seconds. This engine had tubes for conveying lubricating oil from the foot plate to the cylinders, and Mr. Eddy is credited with being the first to use such tubes. Mr. Eddy built at Springfield in all 135 engines, every one of which had, we believe, a straight boiler without a dome. Steam for the cylinders was taken from the front end of a perforated dry-pipe in the top of the boiler extending its whole length. In all the Springfield engines the driving springs and equalizing lever were hung below the fire box and the back part of the frames was made narrow enough to admit of adding several inches more to the width of the fire box than was possible with the ordinary square frame. Mr. Eddy went to Russia in 1856 expecting to stay, but soon returned. He had held various positions in the government of the city of Springfield, and in 1882 was a representative in the Legislature of the state.

ELECTIONS AND APPOINTMENTS.

Alabama Great Southern.—E. H. Kemper has been appointed Assistant Auditor in place of F. H. Crump, resigned.

Atchison, Topeka & Santa Fe.—E. F. Lalk, heretofore Chief Clerk of the general freight office in Chicago, has been appointed General Agent at Pittsburg, Pa., in place of T. M. Orr, resigned. (Sept. 2, p. 638.) D. L. Meyers, heretofore Rate Clerk in the general freight department, has been promoted to the position of Chief Clerk, held by Mr. Lalk.

Atlanta & West Point.—In the reorganization of the Passenger Department the following changes are announced: R. E. Lutz, heretofore Freight Traffic Manager at Montgomery, Ala., has been appointed Traffic Manager in charge of freight and passenger traffic, with headquarters at same point. B. F. Wyly, Jr., heretofore General Agent at Atlanta, Ga., has been appointed General Passenger and Ticket Agent, succeeding John A. Gee, resigned. Mr. Wyly will continue to represent the Freight Department as General Agent, with headquarters at Atlanta, Ga.

Atlantic, Valdosta & Western.—R. H. Brent has been appointed Auditor in place of A. J. Bandy, resigned. The office of General Freight & Passenger Agent has been abolished. B. M. Finlayson, General Superintendent at Haylow, Ga., has resigned and the office of Superintendent has been abolished. J. B. Cutler has been appointed Superintendent of Transportation, reporting to the General Manager. He will have charge of transportation, telegraph and agency matters.

Baltimore & Ohio.—A. K. Handy has been appointed Traveling Freight Agent for the state of New York, and states of Pennsylvania and New Jersey north of the line of the Philadelphia & Reading, with headquarters at 434 Broadway, New York.

Central of New Jersey.—T. B. Koons, Freight and Passenger Agent Lehigh & Susquehanna Division, has been appointed General Freight Agent, succeeding the late P. H. Wyckoff, with headquarters at Jersey City. E. M. Snyder has been appointed Acting Freight Agent, succeeding Mr. Koons, with headquarters at Mauch Chunk, Pa.

Central Ontario.—H. S. Johnson has been elected Vice-President, vice H. P. McIntosh of Cleveland, O.

Chicago, Burlington & Quincy.—George Ward, heretofore Assistant Superintendent Car and Freight Train Service, has been appointed Superintendent Car and Freight Train Service, succeeding George H. Ross, resigned. (Aug. 26, p. 618.)

Chicago, Burlington & Northern.—W. F. Swan, formerly Traveling Freight Agent at St. Paul, has been appointed Contracting Freight Agent, with headquarters at Minneapolis, Minn. W. L. Seely has been appointed Contracting Freight Agent, with headquarters at St. Paul, Minn. John R. Hawley has been appointed Traveling Freight Agent, with headquarters at St. Paul, Minn.

H. G. Cowling, Passenger Agent C., B. & Q. at Chicago office, has been appointed Assistant City Ticket Agent of the C., B. & N. at St. Paul. Mr. Cowling succeeds W. L. Seeley.

Chicago Great Western.—The report that M. C. Healion was appointed Live Stock Agent at Helena, Mont., is officially denied by Mr. Healion.

Frank B. Ross has been appointed City Passenger & Ticket Agent, with office at Dubuque, Ia., vice E. P. Wilbur.

Chicago, Indianapolis & Louisville.—T. N. Johnson, Jr., Traveling Passenger Agent at Chicago, Ill., has been transferred to Lafayette, Ind., to succeed J. M. McConnell, resigned.

Chicago Junction.—J. B. Cox has been appointed Chief Engineer, with headquarters at Chicago, Ill., succeeding C. W. Hotchkiss.

Chicago, Peoria & St. Louis.—The headquarters of W. E. Killen, Superintendent of Motive Power, have been transferred from Springfield, Ill., to Jacksonville, Ill.

Chesapeake & Ohio.—W. E. Conklyn has been appointed Traveling Passenger Agent, with office at Cincinnati, O., in place of T. C. Wells. W. H. Whittlesey has been appointed Traveling Passenger Agent, with office at Dallas, Tex.

Cincinnati, Hamilton & Dayton.—W. W. Penn, heretofore Traveling Passenger Agent, with headquarters at Junction City, Ky., has resigned. He is succeeded by John S. Leahy, with office at Knoxville, Tenn. Mr. Leahy was formerly connected with the C., H. & D. as General Southern Agent at Cincinnati, O., from which position he resigned on account of ill health.

Des Moines, Northern & Western.—W. J. Keeley, Traveling Passenger Agent, will assume the duties of the position of Traveling Freight Agent, held by Guy Talbot, resigned, with headquarters at Des Moines, Ia.

Detroit & Lima Northern.—Frederick Buskirk, who recently went from Cincinnati to Jackson, O., to represent the Ohio Southern, is to return to Cincinnati as General Agent of the D. & L. N.

Erie & Huron (Lake Erie & Detroit River).—At a meeting of the Board of Directors held in Toronto, Ont., Aug. 19, E. Chandler Walker was elected President and Managing Director; S. A. King was elected Vice-President; J. H. Walker, Treasurer, and John E. Foreman, Secretary. The following appointments were made: William Woollatt, Traffic Manager of the Lake Erie & Detroit River, to be General Superintendent and Traffic Manager; A. Leslie, Accountant and Auditor; J. H. Coburn, Solicitor; Owen McKay, Engineer; S. Austin, Mechanical Superintendent, and H. Morris, Road Master.

Galveston, Houston & Henderson.—W. F. McClure, who has been acting General Freight and Passenger Agent, has been appointed General Freight and Passenger Agent. The appointment took effect Sept. 1.

Georgia & Alabama.—R. D. Bowles, heretofore Commercial Agent, with headquarters in New Orleans, has been transferred to Columbus, Ga. He succeeds W. P. Levis, resigned.

E. E. Anderson, heretofore Train Master, has been appointed Purchasing Agent and Assistant to General Manager Gabbett at Savannah, Ga. W. A. Slocum, heretofore Chief Train Dispatcher, has been appointed Train Master, succeeding Mr. Anderson. E. H. Ellersbe has been made General Storekeeper.

C. W. Chears, heretofore Southeastern Agent at Atlanta, Ga., has been appointed General Agent at Montgomery, Ala., succeeding L. N. Manahan.

Georgia Central.—George T. Solar, heretofore Soliciting Agent at Cincinnati, O., has been appointed Commercial Agent at same place, succeeding E. W. White, promoted. (Aug. 19, p. 602.) J. McGinn has been appointed Soliciting Agent at Cincinnati, succeeding Mr. Solar.

Great Northern.—H. A. Jackson, Traveling Freight Agent at Spokane, Wash., has been appointed General Agent, succeeding C. G. Dixon, who has been made General Freight and Passenger Agent of the Spokane Falls & Northern. Mr. Jackson's headquarters will remain at Spokane.

Hutchinson & Southern.—Fred. Carpenter has been appointed Road Master, with office at Hutchinson, Kan., in place of Geo. S. Roberts, resigned.

Illinois Central.—A. H. Egan has been appointed Assistant Superintendent Evansville district of the Louisville Division, in charge of Transportation and Road Departments, with headquarters at Evansville, Ind., in place of L. A. Washington, resigned.

E. H. Coapman, Trainmaster at Kankakee, Ill., has been appointed Assistant Superintendent of the Chicago District, a newly created position. His headquarters will be at Chicago, Ill. James Sullivan, heretofore Chief Dispatcher, succeeds Mr. Coapman as Trainmaster at Kankakee.

Iowa Central.—Horace J. Morse declined a re-election as President and resigned as a Director. George R. Morse was elected a director to fill the vacancy, and Robt. J. Kimball of New York, was elected President. Geo. R. Morse was elected Vice-President and Director, and S. Seaman, Jr., Secretary.

Kansas Midland.—C. L. Fontaine, Auditor and Traffic Manager at Wichita, Kan., has resigned.

Litchfield, Carrollton & Western.—C. M. Stanton, General Manager of the Jacksonville & St. Louis, has been appointed Superintendent of L., C. & W., with headquarters at Carlinville, Ill., in place of T. W. Geer, resigned. (Aug. 26, p. 618.) W. E. Crane of Jacksonville, General Freight Agent of the Jacksonville & St. Louis, has been appointed General Freight Agent of the L., C. & W.

Mexican National.—H. J. Falkenbach, Assistant General Passenger Agent, has been assigned to other duties and the office abolished. W. B. Ryan, General Freight and Passenger Agent, takes charge of all business relating to the Passenger Department.

Michigan Central.—O. F. Jordan, Division Superintendent at Jackson, Mich., has resigned. He is succeeded by F. P. McDonald, Assistant Superintendent of the Canada Southern Division at St. Thomas, Ont.

Missouri, Kansas & Texas.—J. H. Craig, Commercial Agent, has been transferred from New Orleans, La., to Galveston, Tex., succeeding W. J. McMahon. A. G. McGuire has been appointed Commercial Agent, New Orleans, succeeding Mr. Craig. O. C. Gatlin has been appointed Traveling Freight Agent, with office at Houston, Tex., vice A. G. McGuire. T. B. Cookerly has been appointed Traveling Freight Agent, with office at Des Moines, Ia.

Montana Union (Northern Pacific).—H. L. Markus has been appointed Train Master at Missoula, Mont.

Oregon Railroad & Navigation.—At a meeting of the stockholders held at Portland, Ore., Sept. 1, A. L. Mohler was elected President and Director. W. L. Bull of New York, was chosen Chairman of the Board of Directors

Queen Anne's.—A. H. Taylor has been elected Secretary, vice W. W. Busteed.

Santa Fe, Prescott & Phoenix.—The office of F. J. Sarmiento, Auditor and Assistant Secretary and Treasurer, has been removed from Chicago, Ill., to Prescott, Ariz.

Seattle & International (Northern Pacific).—Newman Kline, Superintendent, with headquarters at Seattle, Wash., has resigned and the office has been abolished. G. B. Cliff has been appointed Master of Transportation, with headquarters at same point. O. M. Lang, in addition to his duties as Cashier, will assume the duties of Purchasing Agent, which were heretofore performed by Mr. Kline.

South Carolina & Georgia.—The jurisdiction of the General Superintendent, the Superintendent of Motive Power and the Auditor and the General Manager is extended to cover the Ohio River &

Charleston Railway in the states of North and South Carolina.

Southern Indiana.—F. B. Ogden has been elected Vice-President, and C. F. Weinland, Secretary and Auditor, with headquarters at Chicago.

Southern Pacific.—The office of C. E. Wermuth, Assistant Auditor, has been removed from Houston, Tex., to New Orleans.

W. Lahey, heretofore Roadmaster on the Galveston, Harrisburg & San Antonio Division, has resigned.

Spokane Falls & Northern (Great Northern).—C. H. Prescott has been appointed Master Mechanic, with office at Spokane, Wash.

Texas & Pacific.—A Woods has been appointed Soliciting Freight Agent at New Orleans, succeeding J. M. Carriere. (Sept. 2, p. 638.)

Union Pacific, Denver & Gulf.—T. E. Fisher, Assistant General Passenger Agent, has assumed the duties of General Baggage Agent, made vacant by the resignation of Guy Adams. Mr. Adams' resignation took effect Sept. 1.

Western & Atlantic (Nashville, Chattanooga & St. Louis.)—The position of General Freight Agent, held by J. L. Dickey, has been abolished. (Aug. 26, p. 618.) The jurisdiction of George R. Knox, General Freight Agent of the Nashville, Chattanooga & St. Louis, is extended to cover the W. & A. J. A. Sams has been appointed Division Freight Agent, with headquarters at Atlanta, Ga. Mr. Sams was heretofore General Southern Agent of the Louisville & Nashville and the Nashville, Chattanooga & St. Louis at Atlanta, Ga.

Wisconsin Central.—V. L. Freeland has been appointed General Agent at Cincinnati, O., succeeding O. P. Gothlin, resigned. (Aug. 26, p. 618.)

RAILROAD CONSTRUCTION,
Incorporations, Surveys, Etc.

AMHERST & EASTERN.—Surveys have been postponed until spring, owing to the lateness of the season on this proposed line from Amherst Head, Nova Scotia, east about 20 miles, via Chapman settlement to the Gulf of St. Lawrence. (July 15, p. 522.) J. A. Dickey, Amherst, Nova Scotia, is Secretary.

ARIZONA & SOUTHEASTERN.—The extension of four miles from Naw Junction, Ariz., south to Naw on the International Boundary Line, is completed. (July 15, p. 522.)

ATLANTIC & LAKE SUPERIOR.—This company is reported to have succeeded in floating its bonds in London and building is to be resumed at once. The road when completed is to extend from St. Lawrence River, Ontario, to Gaspe Bay, Quebec. Trains are running between Metapedia, Que., and New Castle, 98 miles, and grading has been in progress for some time on the Baie des Chaleurs and Great Eastern divisions. (March 4, p. 169.)

BRANDON & SOUTHWESTERN.—This line has again changed ownership, being now controlled by a Toronto man, formerly an official of the Canadian Pacific. It is to run from Brandon, Manitoba, southwest through Waskada, 90 miles. At present a land grant of $6,400 per mile for 20 miles, and a cash subsidy of $3,200 per mile have been secured. It is stated that the Great Northern has an interest in the proposed line. (Sept. 2, p. 638.)

CANADA ATLANTIC.—Surveys are reported in progress for an extension of the Ottawa, Arnprior & Perry Sound, from Egan Estate to McCawley Lake, seven miles.

CANADIAN PACIFIC.—Official statement is received that the reported extension from Pointe Fortune, Que., west to Hawkesbury, will not be made. (Aug. 5, p. 571.)

Work is in progress on the extension of the Stonewall Branch from Stonewall, Minn., north 18 miles to Foxton. Neil Keith has the contract. G. H. Gardener is in charge of the surveys. (Aug. 19, p. 603.)

Neil Keith has also the contract for the Pipestone Branch extension from Reston west 25 miles. (Aug. 19, p. 603.) This portion of the road will be built this year, and it is the intention to build 40 or 50 miles more next year. (Official.)

Track is laid for 203 miles west of Lethebridge Alberta on the Crow's Nest Pass extension west to Nelson, B. C., about 330 miles. Trains are running from Mac Leod to Bull Head, over which section the track is in good condition. Between Bull Head and Coal Creek there is a loop from which the line drops several hundred feet over the mountain side into the valley in the form of a letter "S." The Moyie portion of the road is practically completed, including the bridge across the Moyie River. (July 1, p. 485.)

The Nakusp & Slocum extension is to run from Three Forks, B. C., up Carpenter Creek past Kolar Creek, then following the north fork of the Kaslo River to Whitewater, about nine miles. No definite decision as to building has been announced, but it is expected that work will begin at an early date. H. B. Valkene has charge of the surveys. (Aug. 19, p. 603.)

On the Eastern Division it is said that $80,000 is being expended between Cartier and Port Arthur in cleaning out old cuts and reballasting. The few remaining trestles are being filled, wooden bridges replaced and heavy rails are being laid. On the Fort William & Winnipeg extension the work of replacing the few remaining old rails with new and heavier steel is proceeding rapidly. The wooden bridge across Kaministiquia River is being replaced by a new stone arch bridge. (March 3, p. 188.)

CANADIAN ROADS.—Solicitor Mills of Victoria, B. C., gives notice of application to the Parliament of British Columbia for the incorporation of a company to build a railroad from Victoria, via San Juan, along the west coast of Vancouver Island to Hardy Bay, on the extreme north end of the island.

CHICAGO & NORTHWESTERN.—Thirty-seven miles of second track between Baraboo, Wis., and Elroy are now being built. Winston Bros. have the contract for the grading, which will be completed by the first of August, 1899. The bridge masonry will be built by the company.

CHICAGO, BURLINGTON & QUINCY.—The work of straightening the main line of this road in Omaha, Neb., is begun. Telegraph and telephone poles have been moved and grading is under way.

CHICAGO, PEORIA & WESTERN.—This company, already incorporated in Illinois, has filed incorporation papers in Iowa to extend this line from Davenport, across the river from Rockford, Ill., to Marshalltown. The capital stock is $50,000. The incorporators are Lee S. Harrison, Carl J. Langfeldt and Lewis H. Brandt, all of Davenport, Ia. The road is to be built in the interest of the Glucose Sugar Refining Company. (Sept. 2, p. 638.)

COAST RAILWAY OF NOVA SCOTIA.—The war with Spain interrupted negotiations which were about completed for extending this line. Surveys have been made to Halifax. (June 10, p. 420.)

DULUTH & IRON RANGE.—Trains are running over the new line from Waldo, Minn., 18.5 miles, to Colquet River Junction. This is to form part of the main line and has been built to avoid heavy grades on the old road. (June 24, p. 466.)

ERIE.—The State Railroad Commissioners have granted the application to the Goshen Railroad, controlled by the Erie, to build three miles of track, which will go under grade and do away with many hindrances to through freights in that village.

GLADSTONE & NORTHERN.—This road has been located for 15 miles north through Gladstone, Mich. (Sept. 2, p. 639.) The maximum grades are 1 per cent., and the maximum curves are 3°. There is to be one bridge 700 feet long. F. J. Merriam of Gladstone, Mich., is General Manager. (Official.)

IOWA CENTRAL.—At the annual meeting, held Sept. 2, it was decided to build the extension from Oskaloosa, Ia., to Des Moines. It was also decided to build several branches to coal fields, and to extend facilities for marketing coal. The Executive Committee was empowered to carry out these improvements at their discretion. (March 18, p. 208.)

KANSAS CITY, PITTSBURGH & GULF.—The new yards at Kansas City, Mo., have been lately completed. The mileage in these yards exceeds five miles. They were built in order to accommodate the large increase in business.

MEXICAN CENTRAL.—On the branch from Jiminez, Mex., southwest about 55 miles to Parral, track is laid for 65 km. (40.4 miles), and the company hopes to have the line completed by October. (June 24, p. 467.)

MEXICAN INTERNATIONAL.—The entire extension from Reata, Mex., southeast 70.8 miles is graded, and track is laid for 35 km. (21.8 miles). It is expected to have the line ready by November. (June 17, p. 445.)

MISSISSIPPI VALLEY.—The company is reported to have bought 20 acres of land for terminals at East St. Louis. It is stated that the road is to be pushed to completion this fall and winter. The line is projected to extend from East St. Louis southeast down the Mississippi to Cairo, about 135 miles. Part of the grading was done some months ago. Thomas M. Chase, 534 Collinsville Ave., East St. Louis, Ill., is President. (Oct. 29, 1897, p. 775.)

MONTFORT COLONIZATION.—The gage of this line from Montfort Junction to Arundle, Que., has been changed from three feet to standard, and the rails relaid with new 56-lb. steel.

NEW ROADS.—The Goldsboro Lumber Co. is building a logging road in North Carolina, and has 14 miles completed from Dover, south toward Richlands. It is used only for freight purposes at present, and will not be open for regular traffic until connection is made between Kinston and Richland. The company is doing the grading and track laying. W. A. Wimsatt is President; J. J. Street, Vice-President, and Z. T. Brown, Secretary and Treasurer, all of Dover, N. C. (Official.)

The Russellville Ore Co. has built a road three miles long from Russellville, Ala., to Newberg, to be used in hauling iron ore.

The Tower Logging Co. proposes to make an extension of its line from the foot of Lake Vermillion, Minn., northwest 28 miles to Crane Lake. Surveys have been made, and it is reported that work is to begin at once. The line now runs from Tower, Minn., to Lake Vermillion, 18 miles.

Balch & Papard of Minneapolis, Minn., are reported to have received a contract for building a line in Houghton County of the Northern Peninsula of Michigan, to connect Franklin, Jr., and Arcadian mines with the Hancock & Calumet road at Grosse Point, about 12 miles. Work was to begin at once.

NEW YORK, NEW HAVEN & HARTFORD.—The road to Warren, R. I., and Barrington, R. I., is being widened, according to report, about 15 ft. on the easterly side for the purpose of laying an additional track. This will complete the double track between Providence and Warren.

NORTHERN PACIFIC.—About two-thirds of the grading is completed on the Rock Fork Branch from Rockvale, Mont., south through Clarke Fork Valley, 20 miles. Mr. Mike Elmore of Alliance, Neb., has the contract. (June 24, p. 467.)

NORTHWEST.—Contracts are not ready for publication on this proposed line from Nagle, Ore., north 55 miles to Oxbow. (July 22, p. 538.) The work is difficult, being largely canyon and side hill excavation. The maximum grade is 0.3 per cent., the maximum curve 6°. There is to be one bridge, a tunnel of 2,000 feet, and several trestles. Bids for rails and rolling stock will be asked in about 90 days. Isaac E. York of 11 Broadway, New York, is President, and Carlos Gillisple of Huntington, Ore., Chief Engineer. (Official.)

ONTARIO & RAINY RIVER.—E. F. Farquar of Toronto, Ont., who has obtained the contract for the first 19 miles of this line from Stanley, Ont., has sub-let 10 miles. (Aug. 19, p. 603.) Work was begun on Aug. 10, and it is expected that the 19 miles will be completed this year. Surveys will be continued until the line is located to a point not yet determined, on Rainy Lake. (Official.)

OREGON & MISSOURI NORTHERN.—This company was incorporated in Missouri, Sept. 3, with a capital stock of $100,000, to build a railroad in Holt County from Oregon west five miles to the Kansas City, St. Joseph & Council Bluffs line of the Chicago, Burlington & Quincy. The incorporators are Irvng H. Whitcraft, A. J. Clark, C. B. Holmes, Geo. G. Moore and others. Mr. Whitcraft is also General Manager of the Colorado Valley at Sweetwater, Tex.

OREGON RAILROAD & NAVIGATION.—Surveys have been completed, and the work of filling in all the trestles and the building of a solid roadbed in the vicinity of Colfax, Wash., is begun.

PENNSYLVANIA.—Contracts are reported let for an extension of the West Jersey & Seashore from Somer's Point, N. J., across Great Egg Harbor to Ocean City. The contract includes the bridge across the bay, with the necessary railroad connections.

PHILADELPHIA & READING.—The Philadelphia Bureau of Surveys is preparing preliminary plans for the elevation of the P. & R. tracks as far north as Huntington St., Philadelphia. This action is taken in anticipation of the bill introduced to authorize a loan of $3,000,000. It has been stated by expert engineers that the work can be accomplished for less than $2,000,000.

PONTIAC PACIFIC JUNCTION.—No contracts as yet have been let for the proposed extension from Aylmer, Que., northeast 10 miles to Hull. (March 11, p. 188.) This company, jointly with the Ottawa & Gatineau, is building the substructure for the Interprovincial bridge between Ottawa, Ont., and Hull, Que., of which two piers are finished and the third is one-half completed. Rock excavation is going on at the approach to the Ottawa side. (Official.)

RALEIGH & CAPE FEAR.—This road is completed for 12 miles, and trains are running from Raleigh, N. C., to McCullers, 11 miles. (Aug. 5, p. 571.) About 100 men are at work. Good progress is being made on the bridges, trestles, and other engineering work. The line as projected is to extend to Stanhope, 25 miles from Raleigh. (Official.)

RESTIGOUCHE & WESTERN.—The first sod was turned Aug. 12, on this proposed line from a point near Campbellton, N. B., to the St. John River. Malcolm & Ross of St. Leonard's, N. B., have about 300 men at work and the force is to be increased soon. The first 15 miles of the survey have been revised. Ten miles are soon to be located and another 10 will then be made permanent. (June 17, p. 445.)

RICHMOND, PETERSBURG & CAROLINA.—Grading is completed for 20 miles from Petersburg, Va., south to Butterworth's, and 18 miles of track is laid on this grade, of which 16 miles is ballasted. Trains will begin running Oct. 1. All bridges, trestles and other important engineering works are completed up to Stony Creek. The bridge at this point has two spans of 150 ft. each, and a plate girder span of 60 ft. The masonry and other work will not be finished before Oct. 1. About 150 men are at work on this section. Grading is also completed from Ridgway, N. C., to Lacrosse, Va., 20 miles.

A contract entered into with Wm. P. Chapman & Co. has been canceled and the debts incurred in connection with the contract paid. The balance of the work will shortly be relet, but not as before to one contractor for the entire work. (Sept. 2, p. 639.) Gen. James S. Negley of 141 Broadway, New York, is Vice-President and General Manager. (Official.)

ST. LOUIS, SILOAM & SOUTHERN.—Col. H. D. Mackay of Pomona, Mo., President of this company, reports that the money has been obtained for building the road, that the contract is let for the section from Pomona to Fort Smith, Ark., and that engineers are in that field making the permanent survey. (July 22, p. 539.)

SEABOARD AIR LINE.—Rail laying is reported in progress on the Logansville & Lawrenceville extension from Logansville, Ga., northwest 9.9 miles to Lawrenceville. (July 22, p. 539.)

SIERRA OF CALIFORNIA.—Erickson & Co., who graded this road from Oakdale, Cal., to Jamestown, have the contract for the first four miles of the extension from Jamestown, north 20 miles, and work is begun. (Aug. 26, p. 619.)

TRAIL & ROSSLAND.—Work is being pushed rapidly on the standard gaging of this road. Trains now run at night, permitting the contractors to use all possible dispatch in completing the work. (R. R. News, Feb. 25, p. 148.)

VANCOUVER, VICTORIA & EASTERN.—One of the conditions imposed by the British Columbia Government with a subsidy of $4,000 per mile granted to this company for the line from Vancouver, B. C., to Penticton, is that the company shall equip and maintain a ferry steamer suitable for freight and passenger cars between the mainland and Vancouver Island. The road is owned by McKenzie, Mann & Co., of Vancouver, B. C. (Aug. 19, p. 603.)

WASHINGTON, WESTMINSTER & GETTYSBURG.—Contracts have been let for building this proposed line from Gettysburg, Pa., south 86 miles through Littlestown, Pa., and Westminster, Md., to Washington, D. C. Matters have been at a standstill temporarily, but it is expected work will begin in a short time. (Official.) J. B. Colgrove of Washington, D. C., is President. (Nov. 19, 1897, p. 825.)

WEISER, IDAHO & SPOKANE.—Grading is begun, according to report, on this proposed line from Weiser, Idaho, north to Lewiston. The road was incorporated last year, and is being built by New York capitalists into the Seven Devils' mining district. E. E. Forshay of Weiser, Idaho, was made Chief Engineer at the time of the organization.

WESTMORELAND JUNCTION.—Surveys are completed for this newly incorporated Pennsylvania line from North Irwin through Irwin and Jacktown to Guffey on the Baltimore & Ohio, head of the proposed slack water navigation on the Youghiogheny River. (Aug. 26, p. 619.) The work is light. One bridge and 1,900 feet of trestle will be required. Prospects are very encouraging for building. (Official.) A. Frank of Irwin, Pa., is President, and S. A. Taylor of Pittsburgh, Engineer.

WHITE PASS & YUKON.—The section of the road over the White Pass from Skaguay, Alaska, to the Canadian side, is owned by the Pacific & Arctic Railway & Navigation Co. (Aug. 19, p. 603), while the line within the limits of British Columbia is owned by the British Columbia Yukon Railway Co. That section of the Canadian line outside of the British Columbia Province is to be owned by the British Yukon Co., and these three lines are to be operated by a parent company known as the White Pass & Yukon. Close Bros. & Co., of London, England, and Chicago, are the financial agents of the company. The distance from Skaguay to the summit is about 20 miles, and

from the summit to Lake Bennett about 25 miles. The company has about 1,500 men employed, and will be glad to have double that number. Trains are running about half way to the summit of the pass, and it is expected that they will reach the summit early in September, and the lakes about a month later. The heavy rock cut on Porcupine Hill, which has been an obstacle to rapid progress, is finished. The rock cut at the summit of the pass is also completed and ready for track, and much of the heavy work on intermediate points is nearing completion. This includes two or three long heavy rock cuts, and two short tunnels. The maximum grade is 3.9 per cent., and the maximum curve 16°. There are several bridges, none of which require difficult or unusual construction. The larger bridges will be of iron, and the smaller ones trestles. At Skaguay are to be located a large wharf, custom house, etc., which are now building. The line is three feet gage, and the rails 56-lb. It is especially built for winter operation, so as to avoid snow blockades, etc. Several syndicates have been organized to run freight and stage lines this winter between the end of the constructed line and the interior.

The continuation of the line from Fort Bennett to Fort Selkirk is to be pushed as rapidly as possible, but it will not be possible to work during the winter, on account of the short days and severity of the weather. The company hopes to have the line completed to Fort Selkirk before the end of next year. Surveying parties are running lines on that section and the actual location will be determined after the parties come in this fall. (Official.)

WISCONSIN & MICHIGAN.—This company has let the contract for the extension of its line from Faithorn Junction, Mich., north to Vulcan. (Aug. 12, p. 587.) The grader's outfit is on the ground and work is begun in clearing the right of way. Survey is not entirely complete from Vulcan to Iron Mountain, but the company expects that it will shortly be and then will let a further contract for grading from Vulcan to Quinnesec, eight miles. (Official.)

Electric Railroad Construction.

ALLENTOWN, PA.—The Allentown & Emaus St. Ry. Co. has commenced operations on a part of the new road. (July 1, p. 485.)

ATLANTA, GA.—The Atlanta Ry. Co. has asked for franchises covering four additional streets and right of way over the new viaduct.

BUFFALO, N. Y.—The Buffalo, Kenmore & Tonawanda Electric R. R., which was recently bought by Morris Cohn, will form a part of the Buffalo & Lockport system, and track will be laid to make the connection between Tonawanda and Lockport.

FRAMINGHAM, MASS.—The Framingham, Southboro & Marlboro St. Ry Co., it is stated, has commenced operations on part of its road. (July 15, p. 523.)

LAWRENCE, KAN.—The Lawrence Ry. Co. was recently given a 30-year franchise to operate an electric line. This is probably the same enterprise in which Col. W. D. Ewing of Boston and Frank Kern of Mattoon, Ill., are interested.

MANITOU, COL.—Press reports state that the Manitou & Pikes Peak Ry. will change its motive power from steam to electricity. The road is about nine miles long, running from Manitou to the summit of Pike's Peak.

MEDFORD, MASS.—A franchise was recently given to the Boston Elevated Ry. Co. to lay double tracks for surface cars on Main and Salem streets. The West End Company had been trying for several years to get permission to make this improvement in Medford.

NEEDHAM, MASS.—The Needham & Boston St. Ry. Co. is being formed in Needham to build a street railroad about four miles long, between Needham and Spring st., West Roxbury. The route is not finally determined. The capital stock of the company is fixed at $10,000, and the temporary Board of Directors are: C. Atherton Hicks, Frederick G. Tuttle, Edward F. Howe, Victor M. Berthold, Frances de M. Dunn and William W. Carter of Needham, and Edwin L. Booth of Boston. The Natick & Cochituate St. Ry. Co. secured a franchise over the Needham portion of the route last year, but has taken no steps to build, and its franchise will shortly expire by limitation.

NEW YORK, N. Y.—The Metropolitan Street Ry. Co. has completed the change from horses to conduit electric power on the Sixth avenue line, from Fifty-ninth street to Fourteenth street. It is expected that the line will be completed from Thirteenth street to Canal street about Sept. 15.

Mr. Edward Lauterbach, counsel for the Third Avenue Railroad Co., in recent interviews with reporters, said that everything was ready to permit of the speedy converting of the roads to conduit electric. The work is expected to commence this fall on the Third avenue, Forty-second street and 125th street lines. The Dry Dock line will be left over until the spring.

PLAINFIELD, N. J.—The Common Council of Plainfield has given a franchise to the Plainfield St. Ry. Co. to operate cars on Richmond street. This action raises a question of jurisdiction between the Council and the Board of Chosen Freeholders of Union County, which board recently voted to accept John Kean's offer, made in behalf of the Elizabeth St. Ry., of $250,000 for a franchise for an electric railroad between Elizabeth and Plainfield. The main route of this road would be along North avenue Boulevard and Richmond street is also included in the franchise. (See Elizabeth, N. J., Aug. 12, 19, pp. 587, 604.)

PHILADELPHIA, PA.—The Union Traction Co. has completed an extension of its Germantown avenue line from Hillcrest avenue, Chestnut Hill, to the city line, where connection is made with the Roxborough, Chestnut Hill & Norristown Passenger Ry. Co.'s line to Norristown. This makes the second trolley line between Philadelphia and Norristown.

PORT VANCOUVER, B. C.—The British Columbia Ry. Co., Ltd., has completed a new power station at Goldstream. The power is obtained from the falls of Goldstream River.

PORT CHESTER, N. Y.—The Port Chester St. Ry. Co. is preparing to extend its line from the present terminus at the Apawamis Club to the post office at Rye. Work will be begun as soon as the rails and material are received.

TONAWANDA, N. Y.—A certificate of consolidation of the Buffalo, Tonawanda & Niagara Railroad Co. and the Tonawanda Electric Railroad Co. was filed with the Secretary of State. The consolidated roads will be known as the Buffalo, Tonawanda & Niagara Falls Electric Railroad Co. The capital stock of the new corporation is $1,500,000, and its Directors are Henry B. Smith and H. M. Gillett of Bay City, Mich.; T. E. Ellsworth of Lockport, George Sandrock, James A. Roberts and C. M. Howard of Buffalo; James Low of Niagara Falls, and J. A. Rand and B. L. Rand of North Tonawanda. The company will build a double-track road along the river front from Black Rock to Tonawanda, and from the latter point to Niagara Falls a road will be built on private right of way. The company has asked for permission to run its cars in several streets in Niagara Falls, and the Common Council is considering the application. Negotiations are in progress, also, to run cars over the Buffalo Railway Co.'s Niagara street branch, to Hertle avenue and Tonawanda street, in Buffalo.

WASHINGTON, D. C.—The Georgetown & Tenalleytown Railroad is to be rebuilt within the next few months, and extended some miles further out from the city; new cars will also be put on. It is expected that the improvements will be completed before next spring. The company now operates by trolley on about 10 miles of track. Oscar T. Crosby is President, and J. Hite Miller is General Manager.

GENERAL RAILROAD NEWS.

Railroad Earnings.

Showing the gross and net earnings for the periods ending at the date named:

June 30.		1898.	1897.	Inc. or Dec.	
Chicago, Milwaukee & St. Paul.					
12 months	Gross	$34,189,664	$30,486,768	I.	$3,702,896
12 "	Net	12,988,097	11,909,229	I.	1,078,868
Lake Shore & Michigan Southern.					
12 months	Gross	$20,582,453	$19,380,967	I.	$1,201,486
12 "	Net	7,230,905	6,964,798	I.	266,107
Long Island.					
12 months	Gross	$4,296,394	$3,897,320	I.	$399,074
12 "	Net	1,307,021	1,145,352	I.	161,669
Northern Pacific.					
12 months	Gross	$23,679,713			
12 "	Net	12,584,347			
Oregon R. R. & Navigation.					
12 months	Gross	$6,895,393	$4,677,924	I.	$2,217,469
12 "	Net	2,241,983	1,898,897	I.	343,086
Southern Pacific.					
1 month	Gross	$4,338,723	$3,769,278	I.	$569,445
1 "	Net	1,158,420	1,115,028	I.	43,392
12 months	Gross	55,780,337	48,871,901	I.	6,908,436
12 "	Net	21,160,611	17,195,960	I.	3,964,651
Wisconsin Central.					
12 months	Gross	$4,939,725	$4,179,971	I.	$759,754
12 "	Net	1,753,451	1,245,566	I.	507,885

July 31.		1898.	1897.	Inc. or Dec.	
Chicago & Eastern Illinois.					
1 month	Gross	$321 008	$273.876	I.	$47,132
1 "	Net	131.629	103,885	I.	27,744
Cleveland, Cincinnati, Chicago & St. Louis.					
1 month	Gross	$1,146 053	$1,099,659	I.	$46,394
1 "	Net	306,831	253,066	I.	52,765
Erie.					
1 month	Gross	$2,570.096	$2,850.894	D.	$280,798
1 "	Net	697,590	798,185	D.	100,595
Louisville & Nashville.					
1 month	Gross	$1,827,667	$1,795,457	I.	$32,210
1 "	Net	513.726	627,716	D.	113,990
7 months	Net	3,778,261	3,622,685	I.	155,576
Mexican Central.*					
1 month	Gross	$1,018,536	$953,665	I.	$64,871
1 "	Net	306,896	253,309	I.	53,587
7 months	Gross	7,757,829	7,521,418	I.	236,411
7 "	Net	2,468,136	2,444,825	I.	23,311
* Mexican currency.					
Mexican National.*					
1 month	Gross	$509,328	$489,526	I.	$19,802
1 "	Net	219,176	245,277	D.	26,101
7 months	Gross	3,544,426	3,488,551	I.	55,875
7 "	Net	1,595,792	1,686,002	D.	90,210
* Mexican currency.					
New York, Ontario & Western.					
1 month	Gross	$349,887	$407,986	D.	$58,099
1 "	Net	103,179	147,570	D.	44,391
Norfolk & Western.					
1 month	Gross	$865,271	$892,409	D.	$27,137
1 "	Net	268,117	265,810	I.	2,307
Northern Pacific.					
1 month	Gross	$1,916,699	$1,840,360	I.	$76,339
1 "	Net	969,877	790,094	I.	179,783
Oregon R. R. & Navigation Co.					
1 month	Gross	$528,157	$431,131	I.	$97,026
1 "	Net	209,778	189,163	I.	20,615
Rio Grande Western.					
1 month	Gross	$271,807	$306,797	D.	$34,990
1 "	Net	86,656	137,075	D.	40,419
St. Louis & San Francisco.					
1 month	Gross	$497,535	$528,496	D.	$31,961
1 "	Net	158,294	195,473	D.	37,179
Union Pacific.					
1 month	Gross	$1,485,810	$1,399,181	I.	$86,629
1 "	Net	646,556	378,642	I.	267,914
Union Pacific, Denver & Gulf.					
1 month	Gross	$273,654	$284.047	D.	$10,392
1 "	Net	68,347	37,706	I.	30,640
7 months	Gross	2,090,279	1,868,248	I.	220,031
7 "	Net	632,359	441,086	I.	191,273
Wabash.					
1 month	Gross	$1,079,211	$970,635	I.	$108,576
1 "	Net	257,655	329,433	D.	71,778
Western New York & Pennsylvania.					
1 month	Gross	$257,321	$278,228	D.	$20,907
1 "	Net	81,199	98,184	D.	16,985

Aug. 31.		1898.	1897.	Inc. or Dec.	
Buffalo, Rochester & Pittsburgh.					
1 month	Gross	$349,397	$292,646	I.	$56,701
Chicago, Great Western & St. Paul.					
1 month	Gross	$523,045	$487,901	I.	$35,144
8 months	Gross	3,508,736	3,157,320	I.	351,416
St. Louis & Southwestern.					
1 month	Gross	$413,300	$379,600	I.	$33,700
Texas & Pacific.					
1 month	Gross	$522,240	$566,580	D.	$44,340
8 months	Gross	4,515,384	4,083,593	I.	431,791

BALTIMORE & OHIO.—The reorganization managers announce that over 97½ per cent. of the bonds, and over 95½ per cent. of the stock (not including the B. & O. preferred stock, and the Akron & Chicago Junction preferred stock) have been deposited after the plan of agreement of June 22. Further deposits will be received only upon a cash payment of 2 per cent. of the par value of the bonds and an additional cash payment of $2 per share of stock deposited until and including Sept. 15, after which date none of the securities will be received except on such terms as may be determined by the rorganization managers. (Sept. 2, p. 640.)

The receivers will pay the coupons due Sept. 1 on the $2,500,000 bonds of the Central Ohio, amounting to $56,250. These are payable at the Union Trust Company, New York, and at the office of the railroad at Baltimore. Hallgarten & Co. announce that over 92 per cent. of the 5 per cent. second mortgage bonds of the Staten Island Rapid Transit Co., guaranteed by the B. & O., have been deposited with the Central Trust Co., New York, under the July agreement. Further deposits will be accepted until Sept. 9 without penalty, after which there will be a penalty of $20 per bond. (Aug. 26, p. 618.)

BUFFALO & SUSQUEHANNA.—First mortgage 5 per cent., series A, $1,000 bonds to the number of 74, and seven of the series B, $500 bonds have been called for the sinking fund for payment, with accrued interest, on Oct. 1, at Messrs. Harvey Fisk & Sons, New York.

COLUMBUS, HOCKING VALLEY & TOLEDO.—J. P. Morgan & Co., referring to their circulars of Feb. 5, and Aug. 31, 1897, and Feb. 28, 1898, give notice that they will make a further advance of $20 on each $1,000 5 per cent. consolidated bond of 1881, now deposited with them. (May 27, p. 384.)

NEW YORK CENTRAL & HUDSON RIVER.—The stockholders of the New York & Harlem will meet at the company's principal office, New York, Oct. 5, to take final action on the report of the committee appointed by the Board of Directors to agree with the Board of Directors of the N. Y. C. & H. R., upon a settlement of the questions arising out of the lease of April 1, 1873, and the refunding of the consolidated mortgage bonds of the N. Y. & H. (Aug. 19, p. 604.)

NIAGARA CENTRAL.—Following an order from the Department of Railways and Canals at Ottawa, the Niagara Central has been closed for traffic, and before it can be operated again extensive improvements and repairs must be made.

OHIO RIVER & CHARLESTON.—An official circular, issued by the South Carolina & Georgia, states that that company has contracted to operate the railroad and property formerly owned by the O. R. & C. in the states of North and South Carolina, taking possession Sept. 1. The O. R. & C. was sold at auction to the bondholders at Marion, N. C., Aug. 2, and runs from Marion, N. C., to Camden, S. C., 174.27 miles. The section from the North Carolina state line to Ellison Mills, Tenn., 32.34 miles, is not included in this transfer.

PACIFIC ROADS.—The Secretary of the Treasury on Sept. 3 issued a circular offering to redeem the balance of the bonds issued to the Pacific roads as follows:

"By virtue of authority contained in existing law the Secretary of the Treasury gives public notice that United States 6 p. c. bonds, of the face value of fourteen million four thousand five hundred and sixty dollars ($14,004,500), issues under acts of July 1, 1862, and July 2, 1864, in aid of certain Pacific railroads, as stated below, and commonly known as "currency sixes," will be redeemed at any time during the month of September, with interest to and including Dec. 31, 1898, less a rebate of one-half of 1 per cent. upon the face value of the bonds.

"The bonds are in denominations of $1,000, $5,000 and $10,000, and were issued in aid of the following-named railroads: Central Pacific Railroad, $9,197,000; Union Pacific Railroad, $3,157,000; Western Pacific Railroad, $1,650,560; total, $14,004,560."

RICHMOND, NICHOLASVILLE, IRVINE & BEATTYVILLE.—The sale of this road, which was adjourned to Sept. 6, has again been postponed for 30 days. (Aug. 5, p. 572.)

SOUTHERN.—The Central Trust Company, New York, gives notice that it will receive sealed proposals up to Sept. 19 for Richmond & Danville equipment 5 p. c. mortgage bonds of Sept. 3, 1899, at a rate not exceeding par and accrued interest, the total not to consume more than $48,855.

WHEELING & LAKE ERIE.—The committee gives notice that coupons which became due Oct. 1, 1897, and April 1, 1898, on such first mortgage bonds (Lake Erie Division) as were deposited with the Guaranty Trust Co. of New York, under the bondholders' agreement of June 23, 1897, will be paid, with interest, at the office of the Guarantee Trust Co.

WISCONSIN CENTRAL.—The Improvement Committee on Sept. 5 filed a bill of complaint against the Wisconsin Central, the trustees under the two mortgage bond issues, and the receivers of the road, praying that the first and second mortgage issues of nearly $8,000,000 be treated as being retired until the improvement bonds are fully paid. (Aug. 26, p. 620.) They prayed for the retirement of alleged indebtedness, said to be evidenced by eleven promissory notes, aggregating $1,100,000. They also asked for a stay of proceedings on the supplementary bill filed by John N. Stewart, and others, for the foreclosure of the road under the two bond issues. Finally they asked a preliminary injunction restraining the defendants from making any further proceedings, and restraining the receivers from paying them any moneys.

The property of the W. C. lines in Milwaukee, estimated to be worth $1,250,000, will soon be placed on the market, and the Consolidated Land Company, with Geo. D. Vandyke at its head, has been formed to make the sale. This land was bought with the intention of extending the lines of the W. C. into Milwaukee, but, owing to the panic of

1893, and other difficulties resulting in the receivership, it was impossible to carry out this project.

YORK SOUTHERN.—A press dispatch from York, Pa., states that Horace Keesey and N. M. Wanner, for the Northern Central RR. Co., filed a bill in equity Sept. 2, against Warren F. Walworth, the York Southern, and its new Board of Directors. They aver that on June 9, Mr. Walworth entered into an agreement with the N. C., providing for the assignment and transfer of 10,000 shares of the capital stock, and $142,000 of the 5 p. c. mortgage bonds, due 1944, of the Y. S., in consideration of the payment by the N. C. of $160,000. It is charged that Mr. Walworth has failed to keep this agreement, and upon being notified, has refused to do so, declaring the same terminated; that later Mr. Walworth, without the consent and knowledge of the plaintiffs, has delivered these bonds and stock to other persons. The Northern Central declares its willingness to perform its part of the contract. The defendants are given 15 days to answer. (Sept. 2, p. 640.)

TRAFFIC.

Traffic Notes.

The Lake Carriers' Association has voted to send a committee to Quebec to ask the Joint High Commission to abolish the tolls now paid by vessels passing through Welland Canal.

The Gulf, Colorado & Santa Fe Railroad is reported to have pleaded guilty on the charges of secret rate cutting recently made by the Attorney-General of Texas, and it has paid the penalty, $500 each, on twenty charges.

The number of loaded cars passing through Indianapolis in the week ending August 27 was 21,577; and in the preceding week 21,578. These records are the heaviest ever made in that city. A Pittsburgh paper says that the freight cars of the Pennsylvania Railroad are now all in use, with an active demand throughout the company's lines.

The Chicago & Northwestern has made a reduction of 20 per cent. in the rates on freight between Chicago and Waukegan; for the purpose, it is understood, of meeting the competition of a daily steamboat which has run between these two places throughout the present season. The new rates are still 20 per cent. higher than the steamboat rates.

On the occasion of the convention of the Knights of Pythias at Indianapolis last month, the scalpers sold many fraudulent tickets, twelve new brokers' offices being opened in that city. It was found that forged stamps were used for affixing the joint agent's signature to the return portion of the tickets, and in one broker's office, which was examined under a search warrant, 58 forged tickets were found. To prevent further frauds, the joint agent thereafter used a new stamp each day.

The railroads centering in Cincinnati have made a very sensible modification of the baggage-checking regulations for the purpose of relieving the pressure at the G. A. R. encampment in that city this week. Ticket and baggage agents throughout the country have been notified that the baggage of passengers holding G. A. R. excursion tickets who desire to extend their journey beyond Cincinnati may be checked through to ultimate destination via the route of the ticket up to Cincinnati, thence over the route that may be designated by the passenger at the time of checking, regardless of the fact that no transportation is held beyond Cincinnati.

The Sunset Limited trains to San Francisco will be run this year from both New Orleans and Chicago, twice a week from each city; and, according to the San Francisco Chronicle, the two trains will be run separately all the way through, so that west of El Paso there will be four trains a week each way The Chicago train will travel over the Chicago & Alton, the St. Louis, Iron Mountain & Southern and the Texas & Pacific. These trains, with the two trains weekly each way over the Atchison between Chicago and Los Angeles, will make six fast trains weekly each way between the east and the Pacific coast. The cars for the Texas & Pacific train are now being built at the Pullman shops.

A press dispatch from Montreal says that the Canada Atlantic, with its boat lines from Chicago and Duluth to Parry Sound, has brought large quantities of grain to Montreal this season, already producing a marked effect upon the export movement. The line is able to make better time to Montreal than any of the old routes. Without making any special effort, grain is carried from Duluth to Montreal in less than seven days, and from Chicago in 6¼ days. Officers of the road say they expect to carry eight million bushels of grain this season. A New York grain merchant says that the success of the Parry Sound line this year has been largely due to the disturbances of the war, shippers preferring a route through Canada; and that the cost and delay of transfer at Parry Sound and then to and from barges at Montreal will detract from the permanent popularity of the line.

The Flour Committee of the New York Produce Exchange has asked the railroads of the Trunk Line Association to reduce the charges for storage of flour. The rates established by the railroads last June (6 cents a barrel for the first month and 3 cents for each subsequent month), are said to be so high that flour shipments are being driven to other export cities. During the three months just ended, the receipts at New York were 681,565 barrels and 1,109,170 sacks (equal to a total of 1,476,829 barrels), as compared with the equivalent of 1,778,656 barrels in the same period last year. Up to the time of the adoption of the storage charge flour had been stored by the railroads free for almost unlimited periods, creating a discrimination so serious that complaint was made to the Interstate Commerce Commission, and the storage charge was imposed after the Commission had decided that the discrimination was unlawful.

Grain Traffic on the Erie Canal.

The Journal of Commerce (New York) reports the receipts of grain at New York for the four months, May 1 to Sept. 1, as follows, in bushels:

	1898.	1897.	1896.
By canal	10,708,300	10,175,500	19,752,050
By rail	49,350,068	48,848,084	29,156,195

It will be seen that in the aggregate there is no great difference between this year and last, in the proportion carried by the canal as compared with that carried by the railroad, but the comparison with 1896 shows the very great loss which the boatmen have suffered and which has heretofore been noted. The most marked change this year is in wheat, of which the canal got practically none at all, whereas in 1897 it got about a million and a half bushels. Of oats the railroads got this year about thirteen millions as compared with twenty millions last year, while the canal boats got three and a half millions and only one million last year. The boatmen say that the poor condition of the canal is responsible for much of their loss this year, there having been over twenty breaks thus far, many of them serious ones; at the same time, they make the same complaint, as last year, that the railroads make unreasonably low rates. The light movement of wheat, however, is due partly to the fact that enormous quantities were shipped to the Atlantic seaboard early in the season before the canal was opened.

The very low rates made by the railroads have now been in force practically throughout two seasons, and it would look as though this severe injury to the traffic on the canal would be a permanent thing, except at such times as the railroads may find themselves in a position to keep all their grain cars well filled with other kinds of freight, on which they can make a better profit than on grain.

The Interstate Commerce Commission on the Canadian Pacific Passenger Differentials.

The Interstate Commerce Commission has issued a report, prepared by Commissioner Prouty, on the controversy between the Canadian Pacific and the American railroads, concerning passenger fares to and from the Pacific Coast, which was investigated by the Commission at Chicago Aug. 1.

Commissioner Prouty first sums up the history of the case, omitting, however, some details which have been published in previous reports. (See Railroad Gazette of Feb. 25, p. 150; March 4, p. 172; July 1, p. 480, and Aug. 12, p. 588.)

In February last fares from Boston to the Pacific Coast over the Canadian Pacific were reduced from $71.75 and $62.40, to $40 and $30, and other fares were reduced in proportion. The Commission then authorized the American roads to meet these rates without reducing intermediate rates; and then the Canadian Pacific (March 10), made further reductions to $35 and $25. The rate from St. Paul to Seattle, second class, was then made $10; tickets to Portland, Ore., were offered at $5 above the Seattle rate, and this rate was subsequently extended to San Francisco. Further reductions were made in the East, and east bound rates were made the same as west bound. All these low rates are still in force. The suspension of the long haul law by the Commission has been extended to Jan. 1, 1899.

The Canadian Pacific was opened in 1886, and soon made the rate from St. Paul to the Pacific Coast $10 below the tariffs of the other lines, and this low rate was continued in spite of the protests from the American lines. The first Transcontinental Association was formed in 1888. It is doubtful whether the Canadian Pacific then joined, but it is believed that it did. It was then insisting upon its differential, which it had apparently for two years actually enjoyed, and it is hardly probable that it would have been a member, except on the understanding that the differential should be continued. The American lines, however, agreed to it only because they believed that they could not otherwise preserve peace. The Transcontinental Association was dissolved in 1892. The next year the Great Northern was opened to the Pacific Coast and the Canadian Pacific lost its St. Paul connection; but since then it has got control of the Minneapolis, St. Paul & Sault Ste. Marie, so that the company has a line through St. Paul in addition to its main line north of Lake Superior. The Great Northern early reduced its passenger rate from St. Paul to Puget Sound from $60 to $25 (first class). Up to this time the Canadian Pacific connected with Seattle, etc. only by boat, but in February, 1894, it made an agreement with the Great Northern for rail connection, at the same time waiving its claim to a differential, as against the Great Northern, and giving the Great Northern certain facilities for reaching Vancouver.

In the latter part of 1895 a new Transcontinental Association was formed by the Canadian Pacific, the Great Northern and the Northern Pacific; and the Canadian Pacific was to have a differential only on business carried by it north of Lake Superior (the Port Arthur gateway). This differential seems to have been $7.50 first class and $5 second class. In 1897 the Transcontinental Association was dissolved and the American lines insist that the agreement granting the Canadian Pacific a differential was thereby terminated. The published tariffs continued to show them, however. Before long the Great Northern and the Northern Pacific concluded that they would no longer submit, and they tried to get their Eastern connections to join in reducing rates, but this attempt failed and the two roads then began paying excessive commissions, "with the expectation that the agent would divide his commission with the purchaser." About this time the travel to the Klondyke began; the Canadian Pacific tested the market and found tickets on sale for $10 or more below the tariff rate, and then began its open reductions. Mr. McNicoll testified that the Canadian Pacific did not depart from the published rates, and that this reduction was solely to meet the secret rates of his competitors.

Efforts were at once made to bring about a restoration. The Canadian Pacific at first refused to consider the question until the American lines had restored their tariffs, but subsequently expressed a willingness to submit the whole question to arbitration; but the Great Northern objected, claiming that the Canadian Pacific was not entitled to a differential; and the other American lines seem now to have come to the same way of thinking.

There was a good deal of bitterness between the parties at the hearing, but the opinion says:

"We are unable to find in the testimony anything outrageous in the conduct of the Canadian road in this matter. It may have originally used its power to inflict injury as a means of obtaining the allowance of this differential, and if it did, that is precisely what in a greater or less degree every road which obtains a differential, or an advantage in the shape of a differential, does. Possibly its power to inflict injury without corresponding injury to itself may have been exceptional. There may be reasons why this particular differential ought never to have been granted, but if the differential principle is to be admitted at all it can hardly be said that the claim to one when originally made by the Canadian Pacific was utterly without foundation. In insisting upon it, that company was simply claiming what numerous American lines had claimed, and what many of them were enjoying. We find nothing in the negotiations which led to the readjustment of that differential in 1895 which savors of undue constraint upon the part of the Canadian Pacific. Whatever motive may have influenced this road in openly reducing its rates, it is difficult to see what better course it could take in view of existing conditions. The Great Northern and Northern Pacific, its chief competitors, in willful violation of the law which they are required to obey, had not only abolished the differential, but were taking in some instances at least a substantial differential for themselves. The Canadian Pacific claims that as a result of these practices business was unduly diverted from its route. Ought the Canadian Pacific to have indulged in similar practices? Obviously not. If the American lines deemed the differential unwarranted they should have published a rate which ignored it.

"Neither do we see anything radically unfair in the present attitude of the Canadian Pacific to this question. A recognized method of settling differences between competing lines is by arbitration, and the articles of many railway associations provide for such arbitration. When, therefore, the Canadian road proposes to submit to the final determination of one or more disinterested persons the adjustment of these matters in difference with its American competitors, its position is instinctively felt to be a fair one. It may be wrong in its contention, but it can hardly be said to use the methods of the highwayman in enforcing that contention.

"This is not intended and must not be taken as a criticism upon the attitude of the Great Northern road in refusing to arbitrate. Whether a particular controversy shall or shall not be submitted to arbitration is a question for the parties interested. The Great Northern company insists that there is at the bottom of this controversy a principle which, in justice to itself, it ought not to sacrifice, and which it will not sacrifice. It declares that the granting of this differential to this foreign corporation under the circumstances is wrong, and it prefers to establish that principle once for all, no matter how great the cost may be."

Since both parties refuse to yield, the contest may be indefinitely prolonged. **Shall the suspension of** the fourth section be indefinitely continued? The American lines assert that no foreign railroads should be allowed a differential as against an American competitor with respect to American business.

"To this contention we are not disposed to agree. It is open to grave doubt whether from the standpoint of the American railroad the position is a tenable one. The geographical relation of Canada to the United States is such that in several marked instances Canadian lines form a part of important through American lines. This is true of the Grand Trunk Railway, which in the matter under advisement is the ally of the American roads. Many of these lines formed by a combination of American with Canadian roads enjoy differentials. To deny a differential might seriously cripple the entire line, and might injure American much more than Canadian interests. * * *"

Competition has unquestionably reduced rates enormously, and many persons believe that the competition of the Canadian roads has been beneficial to certain sections of the United States. But "to say that a Canadian road shall not under any circumstances enjoy a differential is to say in effect that it shall in no case charge less than the American line. It may carry traffic between points in the United States, but it must do so at the rate fixed by the United States railroad. The application of such a rule might go far toward destroying the benefits of Canadian competition." Whether or not Canadian roads should be allowed to participate in the carrying trade of the United States is for Congress to settle.

Coming now to the question of fact, the purpose of a differential is to equalize disadvantages; but the Canadian Pacific really claims no disadvantage now, except in the time of its trains, and that does not appear to be a valid ground. From Boston to Seattle the time by the American lines is 115 hours, and by the Canadian Pacific (through Port Arthur) 144 hours; to Vancouver 125 hours and 140, respectively. In distance, however, the Canadian Pacific is to Seattle only 83 miles longer, and to Vancouver it is 411 miles shorter. Why, then, should the time be so much longer? The Canadian Pacific has as good a roadbed and as good cars and engines as the other lines. The only answer made is that east of Winnipeg the traffic is so light that only one train can be run, and that must do the local business. But the Canadian Pacific makes much better time over its line through St. Paul, though the distance is a trifle greater, and it is difficult to believe that it could not by a reasonable adjustment of the schedules make the same time by the main line; in other words, it could easily abolish the difference in time. Every other consideration except that of time is against the granting of the differential. In 12 years the Canadian Pacific has grown from a new and imperfect road to a well-known line, with a good reputation. It has rail connections to Seattle and Portland, and runs through cars on certain days of each week from Boston to Seattle. Again, Vancouver is now an important passenger terminal; 10 years ago all passenger business sought San Francisco, but today the Canadian Pacific is in the direct line of a large portion of the traffic.

"It has already been said that the real contest is between the Northern Pacific, the Great Northern and the Canadian Pacific, and it has been further said that for the purpose of a just comparison the Grand Trunk and its connections should be treated as the initial line between Chicago and New England and between Chicago and Eastern Canada. If, upon this basis, these three lines are placed side by side as competing routes between the territory in question east and west, what is the result? In location, distance, construction, equipment, through-car service, reputation, facilities for obtaining business, scenic attractions, the Canadian Pacific would not for a moment admit its inferiority to either of the others. We do not think that the mere fact that that company elects to take more time than its competitors by its best line, while it actually makes substantially the same time by its inferior line, entitles it under all the circumstances to a differential."

Again, the Great Northern, though inferior to the Northern Pacific, does not ask for a differential against it; this shows that the claim that differentials should be made as a matter of right, may not be so well founded as is often made to appear. If the Canadian Pacific comes into the United States to compete with American roads, why should it ask any more than the Great Northern asks? By making this claim, it becomes a disturber of rates.

"* * * Both the representatives of the American lines and of the Canadian Pacific have applied to this Commission with the request and in the hope that some measure might be taken by which it would relieve the unfortunate situation. Apparently the Commission has no power to afford such relief. It cannot allow or disallow the differential in dispute. It has investigated this question for the reason indicated in the foregoing opinion and would deem it extremely fortunate if the conclusions reached might be made the basis of an early adjustment of the matters in difference. It must be distinctly understood, however, that we do not recommend the settlement of this controversy by the making of any agreement involving arbitration or otherwise, which is in violation of the Anti-Trust Law, as interpreted by the Supreme Court of the United States.

The suspension of the fourth section will be continued, but may be rescinded if the roads come to an agreement. The Commission will report to Congress in December if it sees fit to do so.